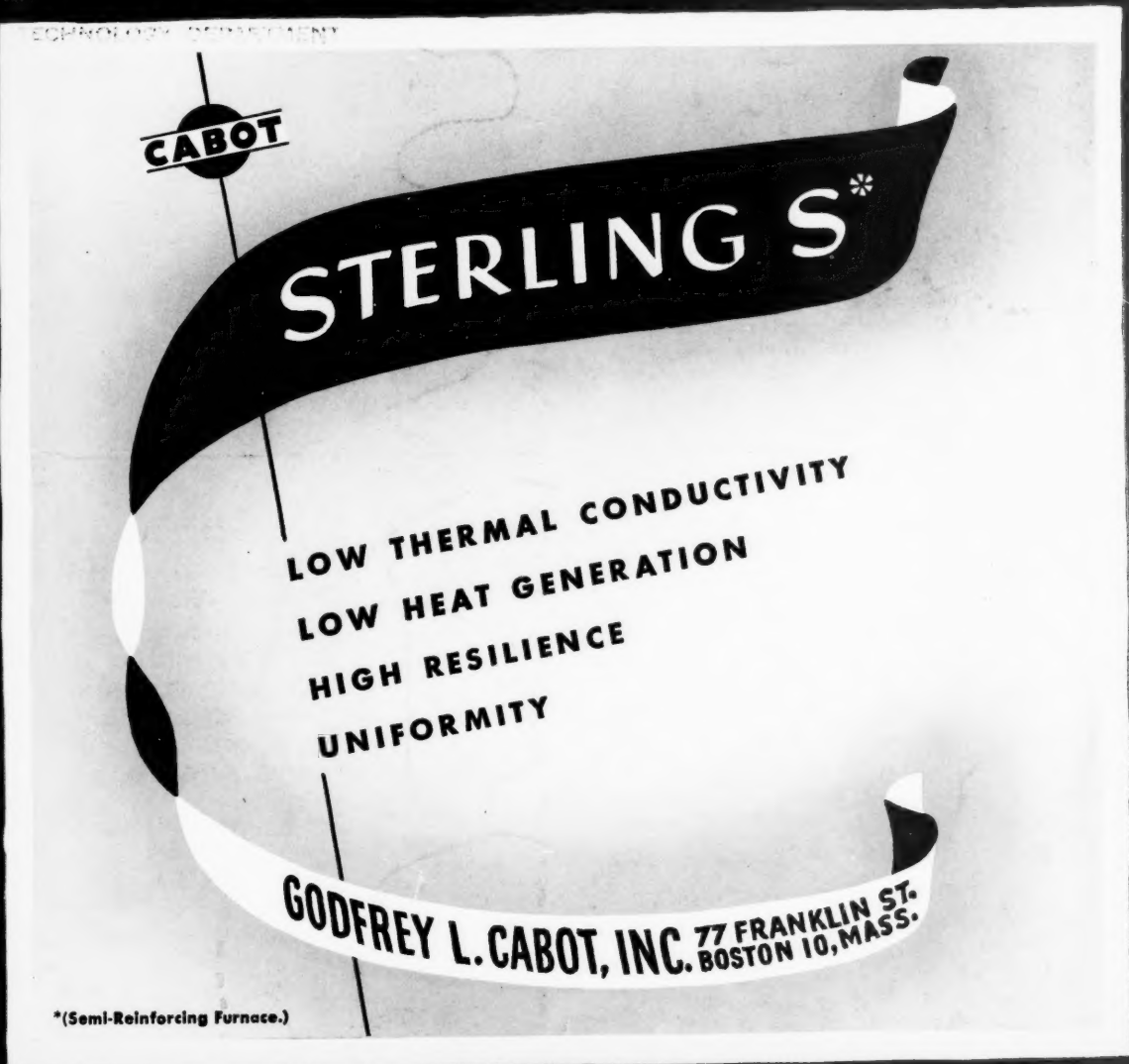
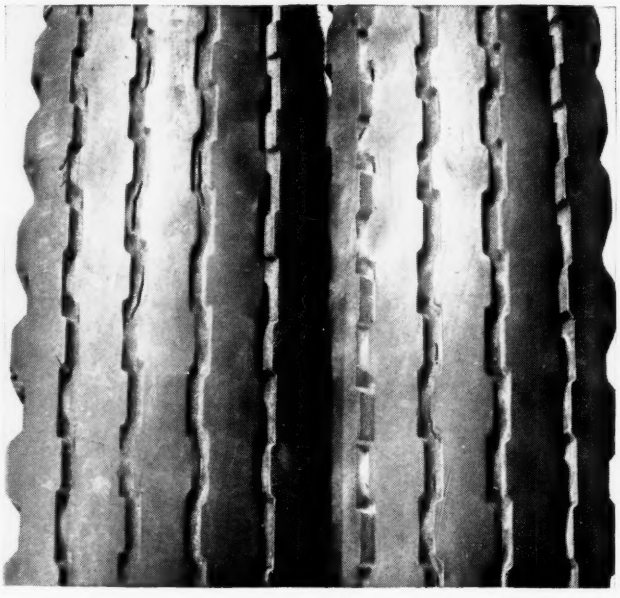
INDIA RUBBER WORLD

SEPTEMBER, 1947



Fortify Tread Stocks Against Flex-Cracking

USE DU PONT
ACCELERATOR
2MT



A comparison of tires after 12,000 miles of service is evidence of the improvement in resistance to flex-cracking obtained by the use of Accelerator 2MT in rubber treads. (Tire on the right was made with Du Pont Accelerator 2MT.)

MANY RUBBER CHEMISTS have been disappointed with the degree of resistance to flex-cracking obtained by substituting rubber for GR-S in tire tread stocks. There is little doubt that increasing the percentage of natural rubber cannot alone solve the problem of flex-cracking. Correct acceleration is an important factor in improved flex-resistance. Accelerator 2MT is outstanding in this respect. For example, in the tire treads shown here resistance to flex-cracking was greatly improved when Accelerator 2MT was substituted for MBT. That's why tire technologists are using Accelerator 2MT to solve flex-cracking problems.

Other important advantages of Accelerator 2MT in rubber stocks:

Exceptionally low heat build up.

Little tendency to revert during long curing.

Excellent resistance to tear at elevated temperatures.

Outstanding resistance to heat and aging.

These characteristics suggest the use of Accelerator 2MT in compounds for dynamic service where the vulcanizate is exposed to severe mechanical working, such as in tires, belts and vibration dampeners.

For more complete information on Accelerator 2MT, write to:

E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington 98, Delaware.

Tune in to Du Pont "Cavalcade of America," Monday nights—8 p.m. EST, NBC

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co., (Inc.), Wilmington 98, Del

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

DU PONT

INDIA RUBBER WORLD, September, 1947, Vol. 116, No. 6. Published Monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as Second-Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1875. Subscription, United States and Mexico, $3.00 per year; Canada $4.00; All Other Countries, $5.00; Single Copies 35 Cents. Address Mail to New York Office.

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SEP 24 1947
DETROIT

★ EXCELLENT AGE RESISTANCE

RESILIENT parts made from HYCAR American rubber resist the aging effects of air, sunlight, ozone, heat, cold, and all other types of oxidation. That's why they *stay* resilient—and stay on the job for a long, long time.

Other important properties of HYCAR American rubber are shown in the box at the right. And it's important to know that these properties may be had in an almost limitless number of combinations—each compounded to meet a given set of service conditions.

We make no finished products of HYCAR. But we urge you to ask your supplier for parts made from this versatile material. You'll learn for yourself that it's wise to use HYCAR—in difficult or routine applications—for long-time, dependable performance. For more information, please write Dept. **HA-9**, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

CHECK THESE SUPERIOR FEATURES OF HYCAR

1. EXTREME OIL RESISTANCE — *insuring dimensional stability of parts.*
2. HIGH TEMPERATURE RESISTANCE—*up to 250° F. dry heat; up to 300° F. hot oil.*
3. ABRASION RESISTANCE—*50% greater than natural rubber.*
4. MINIMUM COLD FLOW—*even at elevated temperatures.*
5. LOW TEMPERATURE FLEXIBILITY—*down to —65° F.*
6. LIGHT WEIGHT—*15% to 25% lighter than many other synthetic rubbers.*
7. AGE RESISTANCE—*exceptionally resistant to checking or cracking from oxidation.*
8. HARDNESS RANGE—*compounds can be varied from extremely soft to bone hard.*
9. NON-ADHERENT TO METAL—*compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)*

Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

This advertisement appeared in a long list of carefully selected business papers TO HELP YOU SELL parts made from HYCAR.

PHILBLACK-O LAUGHS AT ABRASION!

Philblack-O lets your rubber products take a whale of a beating and still come up smiling! It's truly remarkable what wonderful abrasion resistance Philblack-O imparts! We've put tires made with Philblack-O through test after test . . . in the laboratory . . . on the road . . . and all with good results. We think you'll be delighted with the performance, too, if you put this new "magic black" to work for you.

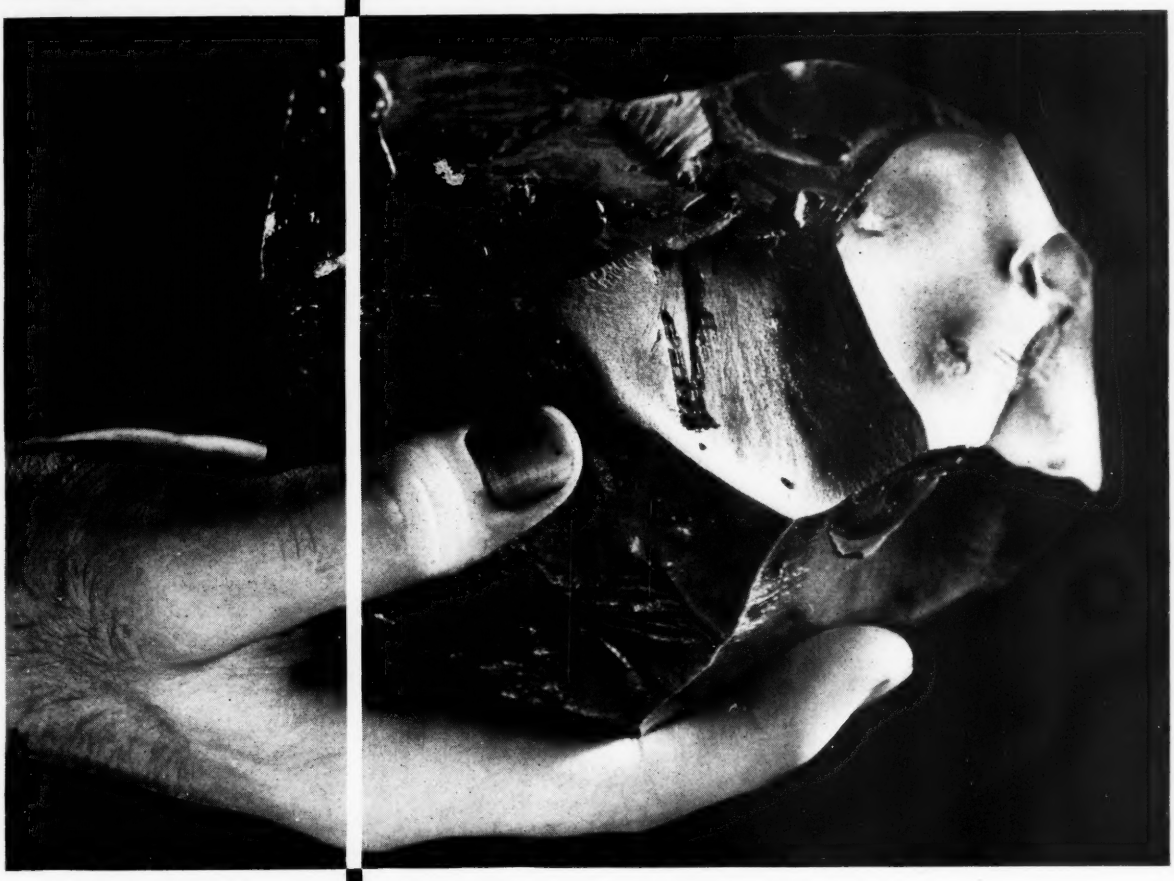
Although abrasion resistance is his most startling faculty, Philblack-O has many other claims to fame. Send for a trial order today. Find out for yourself the many places in which Philblack-O can be of value.

PHILLIPS PETROLEUM COMPANY

Philblack Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

this is p,p' DIAMINODIPHENYLMETHANE



Naugatuck Chemical calls it TONOX

It is recommended for use in natural rubber compounds to increase flex-life, lower hysteresis, improve abrasion, and prevent "frosting" caused by atmospheric ozone.

Try TONOX in tires, beltings, hose, footwear and other rubber products.

Write for new bulletin on TONOX.

***PROCESS-ACCELERATE-PROTECT WITH* NAUGATUCK CHEMICALS**

NAUGATUCK CHEMICAL

Division of United States Rubber Company

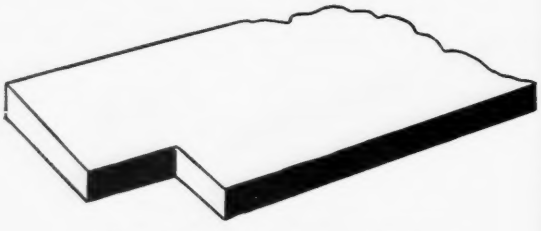
1230 AVENUE OF THE AMERICAS • NEW YORK 20, N. Y.

IN CANADA: *Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ont.*

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Nebraska*



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

- LARGE SOURCE OF FARM PRODUCTS
- LEADER IN DAIRY PRODUCTS
- MAJOR LIVESTOCK PACKING AND PROCESSING CENTER
- AMPLE WATER SUPPLY
- NATURAL GAS, COAL, OIL AND ELECTRIC POWER
- RICH MINERAL DEPOSITS
- DIVERSIFIED INDUSTRIAL ACTIVITY
- STRATEGIC DISTRIBUTION LOCATION
- EXCELLENT RAIL TRANSPORTATION
- SKILLED, FAIR-MINDED LABOR
- NO SALES OR INCOME TAX

Industries engaged in the packing or processing of farm products find Nebraska a rich source of raw materials. Corn, grains, sugar beets, potatoes and other vegetables are grown in abundance.

Omaha is a leading meat packing and poultry processing center. It frequently leads the nation in livestock receipts, is located in the world's largest butter producing area, and houses the nation's second largest industrial alcohol plant.

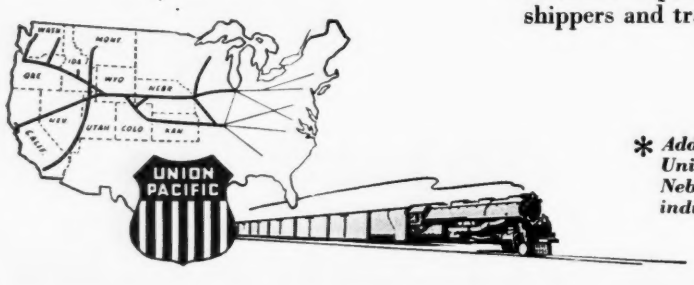
In addition to agricultural activity, there is diversified industrial manufacturing such as farm machinery, air conditioning equipment, fabricated steel, brick and tile.

Nebraska has large mineral deposits; gypsum, salt, potash, sand, gravel, stone, etc. Natural gas, petroleum and coal are readily available.

Of particular interest to industry is Nebraska's "pay-as-you-go" policy; no state sales, income or luxury taxes. It is a good place to work and live.

★ ★ ★

In Omaha are the headquarters of the Union Pacific Railroad which provides efficient, dependable transportation for shippers and travelers.



* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

Good-rite
VULTROL
for use in American rubber compounding
to prevent scorching, and for recovering
scorched stocks
GOOD-RITE AND VULTROL REG T M U S PAT OFF

For technical data please write Dept. CA-9

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

At Philadelphia, a testboard man answers as an electronic watchman calls attention to conditions on one of the coaxial systems to Baltimore and Washington.

"Send Help to Manhole 83"

Strung out along every Bell System coaxial cable, electronic watchmen constantly mount guard over your voice. Some are in manholes under city streets; some are in little huts on the desert. Most situations they can deal with; if things threaten to get out of hand, they signal the nearest testboard.

Principal care of the electronic watchman is the transmission level. Sun-warmed cables use up more energy than cold ones, so a transcontinental call may take a millionfold more energy to carry it by day than by night. Each watchman — an electronic regulator — checks the transmission level and adjusts the amplification which sends your voice along to the next point. Many hundreds of regulators may be at work on a single long distance call.

Without automatic regulation, the precise control of energy in the Bell System's long distance circuits would be a superhuman task. So Bell Laboratories, which in 1913 developed the first high vacuum electronic amplifier, went on to devise the means to make them self-regulating in telephone systems. This is one reason why your long distance call goes through clearly, summer or winter.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service.

BELL SYSTEM
AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES

SHELL DUTREX 6

Plasticizer and Extender for GR—S

Chemically and physically Controlled

Direct inquiries to:

SHELL OIL COMPANY, INCORPORATED

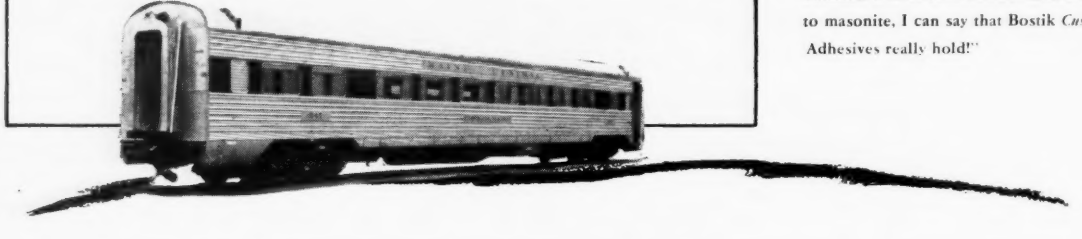
50 WEST 50th ST., NEW YORK 20, N. Y.
(East of Rockies Territory)

100 BUSH ST., SAN FRANCISCO 6, CALIF.
(Pacific Coast Territory and Western Canada)

SHELL OIL COMPANY OF CANADA, LTD., 25 ADELAIDE ST., EAST TORONTO, CANADA
(Eastern Canada)

Pullman Uses BOSTIK

CUSTOMIZED ADHESIVES TO Bond Interior Car Joints



Foreman of Joiners Department at the Pullman Standard Car Mfg. Co. plant in Worcester, Mass., Mr. Frank Lominsky says: "From our experience in the use of Bostik, bonding steel to steel and bonding aluminum to masonite, I can say that Bostik *Customized* Adhesives really hold!"

Bostik *Customized* Adhesives are used as seam filler between steel and steel, and between aluminum and masonite, in interior joints of railway coaches, diners and trackless trolleys built by Pullman Standard Car Company.

Whatever materials, or combination of materials, you wish to bond together, call on B. B. There's a Bostik *Customized* Adhesive for every job. Almost every day, Bostik Adhesives find new uses, supplanting old-style bonding methods in different industries, in different applications, under widely varying conditions.

Write for full information today.

B B CHEMICAL COMPANY, CAMBRIDGE, MASS.

"Whatever It Is BOND IT WITH BOSTIK"

SUBJECT: *United Blacks*

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON

SUBJECT: *United Blacks*

United blacks are known round the world for dependable quality and satisfactory performance.

United's mastery of channel and furnace black manufacture has created in their blacks that fine balancing of properties so conducive to good processing and sturdy wear.

United blacks are scientifically controlled, and therefore score high for uniformity.

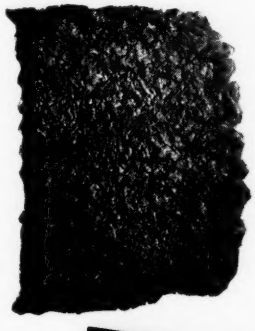
United blacks meet all your specifications all the time.

Reach a high standard in your goods by standardizing on United blacks.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia



1,200 grams of GR-S, processed by conventional methods. Note small area and roughness, due to shrinkage.

1,200 grams of GR-S and Pliolite S-6, milled under identical conditions. Note larger area and smoothness of stock, due to elimination of shrinkage.

HERE'S WHY

PLIOLITE S-6

makes better molded, calendered, extruded goods

THE above photos illustrate one of the most important advantages of **PLIOLITE S-6** — *it prevents shrinkage* and thereby aids processing. That's one of the reasons it's a superior reinforcing agent for molded, calendered and extruded goods — not only in GR-S, but in Buna N, Neoprene and natural rubber, too.

When compounded with **PLIOLITE S-6,** molded items keep their shape better. Calendered products come out smoother. Extruded goods are smoother, too; more uniform in cross section.

What's more, **PLIOLITE S-6** provides more easily handled compounds, because it acts as a plasticizer at processing temperatures. Its reinforcement is positive — coupling extra hardness with negligible loss in elongation. Often elongation is increased.

At its new low price, **PLIOLITE S-6** is more economical to use than ever. Available as a powder for your own mixing, or in master batches in whatever synthetic you select. For complete information and sample, write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

Pliolite—T.M. The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

Meet Mr. Fulscope your new budget controller

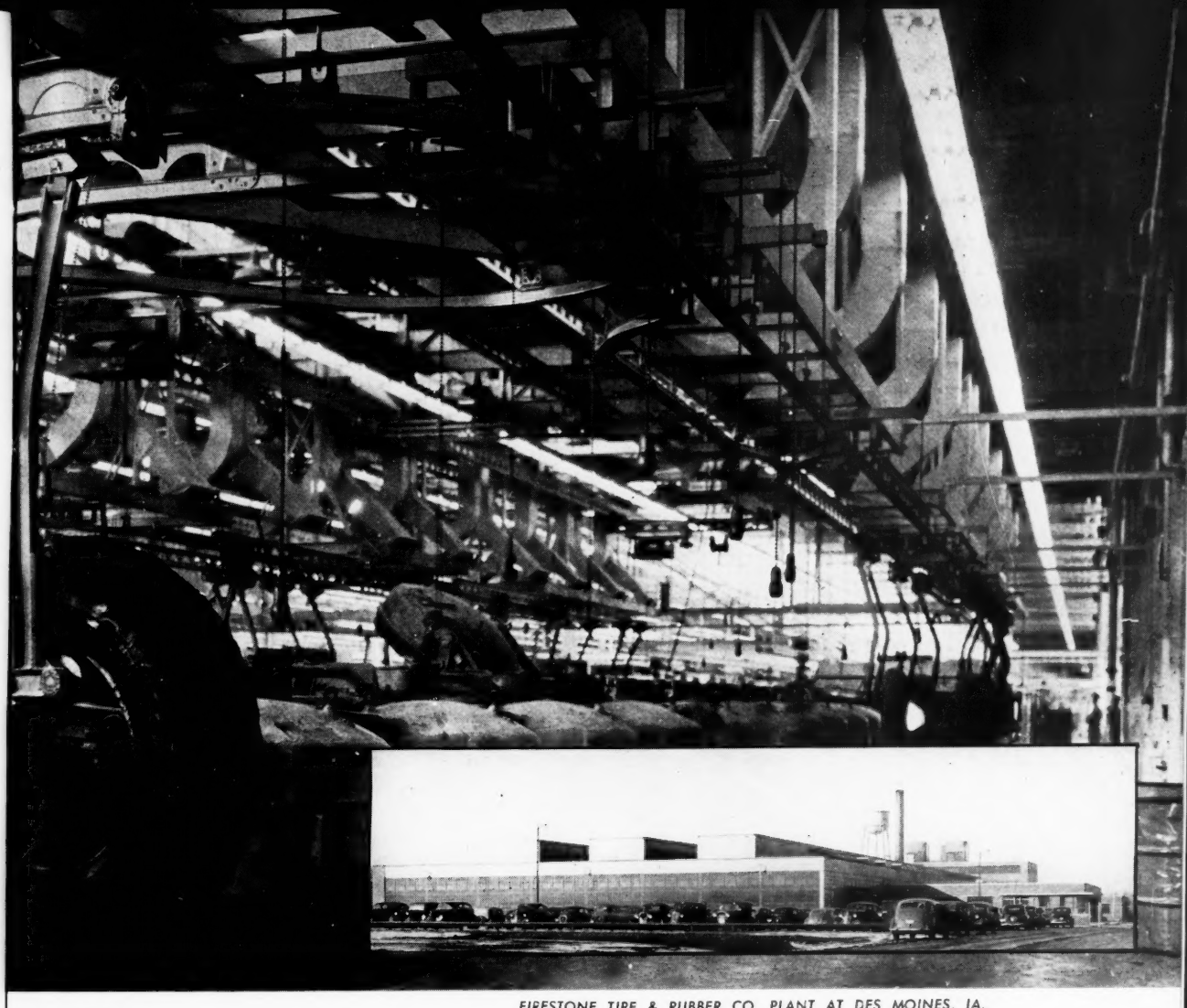
THIS is a Taylor Fulscope Controller, the versatile air-operated controller that maintains precise platen press temperatures automatically. It can be a real "budget controller" for you because it can help you beat rising costs by increasing efficiency.

Taylor Fulscope Recording Controllers are built to master your toughest temperature control problems. Once the desired control point is set, they automatically repeat the same controlled temperature for each cycle. Here are a few of their outstanding features:

1. **Sensitivity adjustment.** Magnified dial calibrated in absolute units.
2. **Automatic reset.** Single continuous adjustment; much wider range.
3. **Pre-Act.** The control effect based on *rate* of pen movement.
4. **Precise set-point adjustments.** Removable plastic knob.
5. **Chart Locking mechanism.** Permits quick, one-hand chart changing.

Whether you're molding tires or mechanical goods, making golf balls, or vulcanizing foam rubber, you can depend on Taylor Fulscope Temperature Controllers to hold the precise temperatures required throughout the process. This is just another way we're helping the rubber industry to keep quality up and costs down. May we help you? Ask your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY



FIRESTONE TIRE & RUBBER CO. PLANT AT DES MOINES, IA.

FOR RUBBER & PLASTICS MANUFACTURING PROJECTS

. . . . . experienced engineers who will furnish complete engineering services for the project. They will develop equipment layouts, designs, and specifications for both equipment and structures, and obtain suppliers' and contractors' proposals from which efficient purchases can be made. They will provide supervision for the construction of buildings, the installation of equipment, and assistance in initial plant operation.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION

1000 MARQUETTE BUILDING, DETROIT

RUBBER

OUR NATIONWIDE ORGANIZATION IS EQUIPPED TO SERVE YOU PROMPTLY FROM STRATEGICALLY LOCATED CENTERS

Boston 10, Mass., 80 Federal Street
Buffalo 2, N. Y., 443 Delaware Avenue
Charlotte 1, N. C., 224 West 2nd Street
Chicago 4, Ill., 23 E. Jackson Boulevard
Cincinnati 2, Ohio, 2906 Carew Tower
Detroit 2, Mich., 501 Stephenson Building
Los Angeles 21, Calif., 1315 E. 7th Street
New Orleans 12, La., 731 Whitney Natl. Bank Bldg.
New York 1, N. Y., Empire State Building
Philadelphia 3, Pa., 1600 Arch Street
Portland 4, Ore., 717 Lewis Building
Providence 1, R. I., 200 Grosvenor Building
Rochester 4, N. Y., 70 Exchange Street
St. Louis 10, Mo., 4030 Chouteau Avenue
San Francisco 4, Calif., 405 Montgomery Street
Toronto, Ontario, Canada, 250 Van Horn Street

STEIN HALL

285 MADISON AVENUE NEW YORK 17, N. Y.

EST 1866

DOUBLE-CHECKED ✓ CHEMICALS FOR THE RUBBER INDUSTRY

TETRAETHYLTHIURAM DISULFIDE

SHARPLES ACCELERATOR
62-0
TETRAETHYLTHIURAM
DISULFIDE

SHARPLES ACCELERATOR 62-0

PROPERTIES:

Appearance	cream colored powder
Specific Gravity at 20°/20°C.	1.17
Melting Point (approx.)	69°C.
Molecular Weight	296.4

USES:

AS A:

Primary Accelerator	Vulcanizing Agent
Secondary Accelerator	Retarder for neoprene

IN:

Latex	Inner Tubes
Wire Stocks	Mechanical Goods
Sponge Rubber	Heat Resistant Stocks
Tires	Non-Tarnishing Stocks

WITH:

Natural rubber	Nitrile rubber
Butyl rubber	Neoprene
Styrene rubber	

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC. PHILADELPHIA • NEW YORK • CHICAGO • AKRON

Technical Bulletin No. 36 — **on the Compounding of GR-S with Substantial Loadings of ZINC OXIDE**

GR-S—X-353 and X-354 with 100 Parts of Zinc Oxide

The *Office of Rubber Reserve* defines these polymers as follows:

X-353: *"Activated GR-S polymerized at lower temperature to lower conversion, 50 Mooney. Lower temperature necessary for an activated recipe during polymerization and lower conversion generally favor processing. This polymer will be used as a control for X-354 in tire treads."*

X-354: *"Polymerized under same conditions as X-353, but has a 90-100 Mooney viscosity. Higher Mooney variation of X-353 is expected to produce better wear in tires."*

COMPOUND NO. 36

Polymer	100.0
Sulfur	3.0
MBT	2.0
DPG	0.1
Coumarone-indene Resin	7.5
E.L.C. Magnesia	5.0
ZINC OXIDE	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
GR-S—X-353										
4	1850	730	205	290	410	660	.30	49	—	—
7.5	1830	645	255	340	555	890	.29	50	63	42
15	1540	590	270	385	575	960	.24	51	67	37
30	1320	525	310	465	700	1165	.20	52	63	39
45	1520	570	305	420	610	1030	.23	53	60	40
60	1670	580	270	425	620	1050	.23	53	63	35
90	1040	505	270	425	615	1000	.16	53	64	35
GR-S—X-354										
4	2120	610	315	590	900	1410	.22	50	—	—
7.5	1900	510	355	715	1070	1740	.19	52	66	37
15	2000	490	460	770	1270	—	.21	55	74	37
30	1715	445	455	800	1330	—	.17	56	71	35
45	1820	470	395	715	1270	—	.18	56	65	34
60	1865	480	425	740	1200	—	.18	56	69	35
90	1580	435	460	810	1345	—	.16	56	72	38

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Per Cent Rebound	Hardness: Shore	Rex	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70° C. Inches Failure 1900 Cycles	Mooney Plasticity After 1½ Min.
GR-S—X-353											
60	7.75	66.0	52	55	24.2	17'-7.5	27.3 (At 15'-27.3)	14.8	20.5	.91	54
GR-S—X-354											
60	7.47	69.3	56	59	23.0	15'-4.6	22.8	13.0	15.0	1.0	84

Test Conditions: 143 Lb. Load. 0.175" Stroke. 100° C. Oven Temp.

X-353 gives somewhat better results generally than Standard GR-S with high Zinc Oxide loadings. With X-354 higher stress-strain values are realized, as is the usual experience with high Mooney polymers. Tear resistance, pendulum rebound and heat generation are better. The cut-growth is on the low side, probably on account of the fact that the cure selected was on the "over"-side.

HORSE HEAD PRODUCTS New Jersey zinc

THE NEW JERSEY ZINC COMPANY

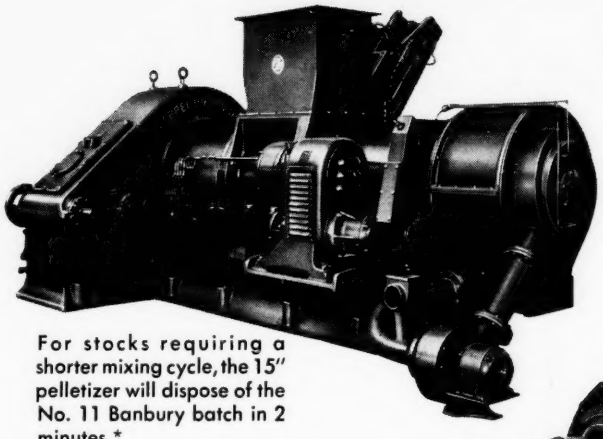
160 FRONT STREET • NEW YORK 7, N. Y.

***Products Distributed by* THE NEW JERSEY ZINC SALES COMPANY**

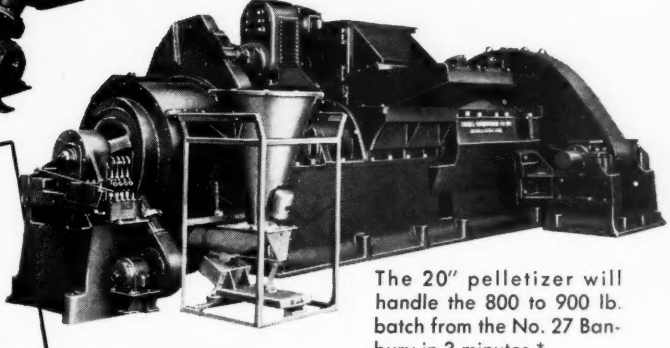
NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO • LOS ANGELES

WHICH OF THESE PELLETIZERS WOULD BE BEST FOR CUTTING YOUR HANDLING COSTS?

The 12" machine will dispose of the 400 to 450 lb. batch from the No. 11 Banbury in 3½ minutes.*



For stocks requiring a shorter mixing cycle, the 15" pelletizer will dispose of the No. 11 Banbury batch in 2 minutes.*



The 20" pelletizer will handle the 800 to 900 lb. batch from the No. 27 Banbury in 3 minutes.*

The Hale Pelletizer transforms bulky, hard-to-handle rubber into small, free-flowing pellets that can be *automatically* conveyed, weighed and mixed. In addition to cutting handling costs, the extra working that the stock gets in passing through the pelletizer improves the plasticity and gives better dispersion of the various ingredients.

OTHER PROCESSING ADVANTAGES that you get with a pellet rubber system include:

1 Increased production—Banbury mixing cycle reduced.

2 Pellets thoroughly cooled more quickly—reduces time between processing operations—less stock in process.

3 Less floor space required—floor storage and trucking eliminated.

4 Cleaner mill room — dust eliminated because pellet handling system is completely sealed in.

You can get complete information and engineering help on pelletizers and the pellet rubber system by sending a request on your letterhead. Write today, no obligation of course.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

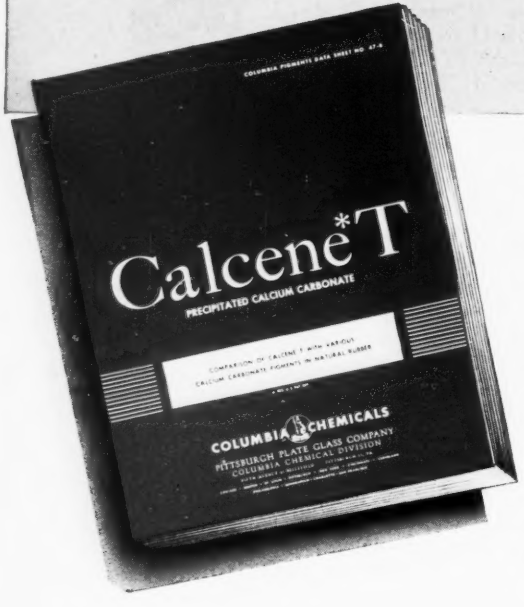
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston.

Farrel-Birmingham

FB-403

*All figures are approximate; time will vary slightly depending on the type of stock, specific gravity, consistency and flow characteristics.

new data helps compounders with their selections



In selecting a calcium carbonate for the most efficient and economical results in a natural rubber compound for any specific job, the compounder obviously must evaluate three factors: (1) the cost of the volume of pigment required; (2) the processing costs; (3) the scrap loss.

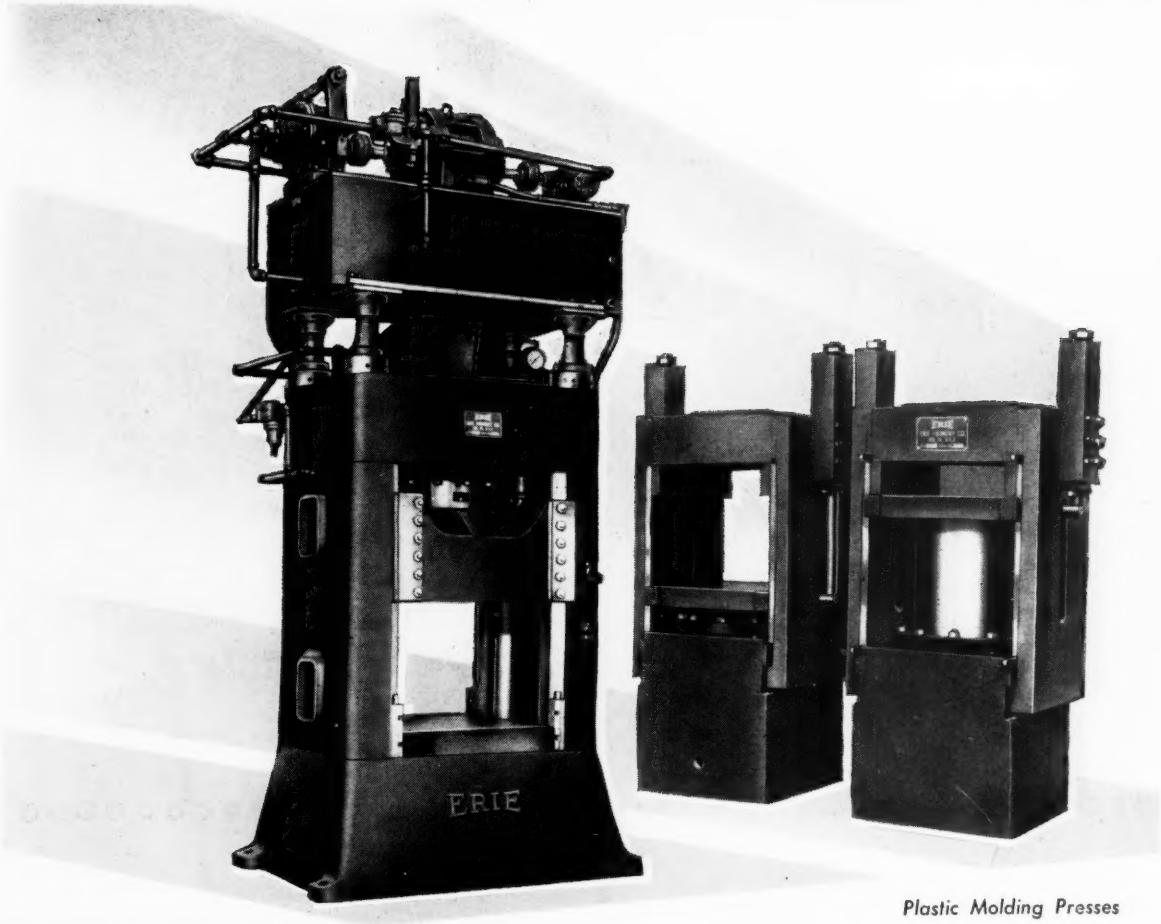
New data—"COMPARISON OF CALCENE T WITH VARIOUS CALCIUM CARBONATE PIGMENTS IN NATURAL RUBBER"—has been accumulated from comprehensive tests of both surface-treated and untreated materials representative of the range of particle sizes encountered. Two types of acceleration were used—thiazole and guanidine; two mixing methods—direct, or dry, and masterbatch; loadings range from ten to forty volumes. For purposes of further comparison, tests also included three other non-black pigments—zinc oxide, aluminum hydrate and iron oxide.

This forty-one page booklet will be sent to you on request. Simply ask for Columbia Pigments Data Sheet No. 47-6. Write to Pittsburgh Plate Glass Company, Columbia Chemical Division, Fifth Avenue at Bellefield, Pittsburgh 13, Pennsylvania.

COLUMBIA CHEMICALS

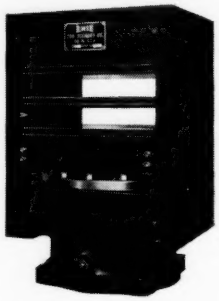
PAINT · GLASS · CHEMICALS · BRUSHES · PLASTICS

PITTSBURGH PLATE GLASS COMPANY



500 ton Forming Press. We also build it in any size required

Plastic Molding Presses built in any size needed



Side Strain Steam Platen Press, built in all sizes

Erie Hydraulic Presses

the Product of 40 years of "Know How"

FOR 40 years, Erie Foundry engineers and craftsmen have designed and built hydraulic presses for rubber and plastics. No requirement is too small and none too big. The experience, "know how", which we have gained over this long period, is built into the Erie Hydraulic Presses which we build for your needs. Your copy of Bulletin 334 will be sent on request.

ERIE FOUNDRY COMPANY HYDRAULIC PRESSES

ERIE FOUNDRY COMPANY • *Erie, Pa., U.S.A.*

DETROIT / 335 Curtis Building / CHICAGO / 549 Washington Boulevard / INDIANAPOLIS / 335 Postal Station Building / LOS ANGELES / 2505 Santa Fe Avenue / SAN FRANCISCO / 2070 Bryant Street

From Tires for Motor Cars to Grips for Handle Bars

Dutch Boy: "It's true of almost every product . . . if it's made with rubber . . . *it's better made with Red Lead.*"

Plant Chemist: "Just why are you so sure?"

Dutch Boy: "First, experiments showed, then experience *proved*, that compounding rubber with #2 RM Red Lead gives the advantages listed on the right."

Plant Chemist: "But don't those advantages depend on what I make?"

Dutch Boy: "Yes, they do. You get all seven if you make tires; but *most* of them apply with other fields, too."

Plant Chemist: "But don't they depend on the base I use?"

Dutch Boy: "They apply whether you work with GR-S, GR-S-10, GR-M, GR-A or GR-I. Just let us know your specific application, and our technical staff will gladly supply literature and any other information you need. Drop a line to the Rubber Division of our Research Laboratories, 105 York Street, Brooklyn 1, New York."

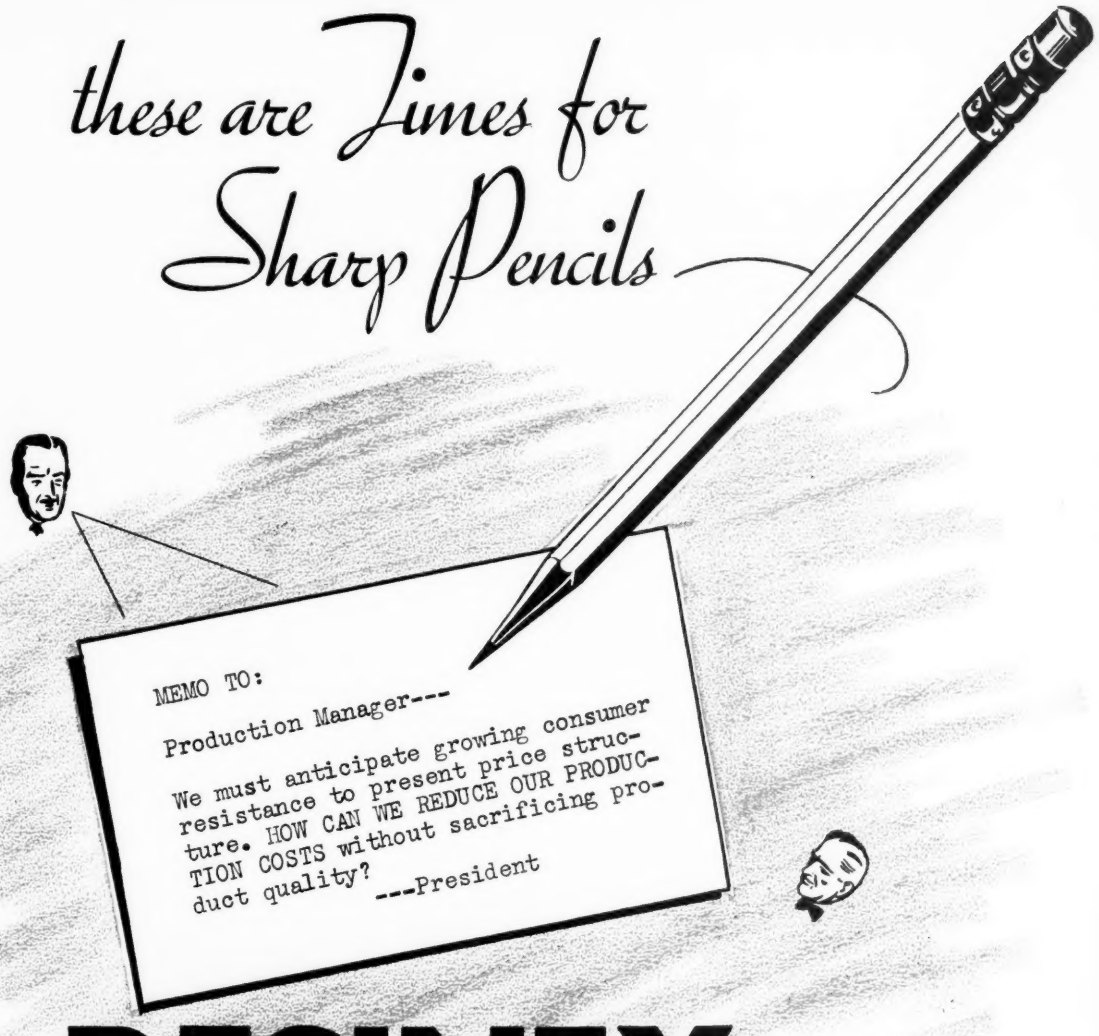
CHOOSE YOUR OWN Rx REASONS FOR COMPOUNDING RUBBER WITH #2 RM RED LEAD

1. *Improved Heat Stability—Retention of Elasticity*
2. *Lower Heat Build-up—Cooler Running*
3. *Economical*
4. *Faster Curing Rate*
5. *Extended Curing Range*
6. *Excellent General Physical Properties*
7. *Safe Processing*

NATIONAL LEAD COMPANY—New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6, (National Lead Co. of Mass.); Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.); Charleston 25, West Virginia, (Evans Lead Division).

If it's made with Rx RUBBER ... it's better made with RED LEAD

these are Times for Sharp Pencils


MEMO TO:
Production Manager---
We must anticipate growing consumer resistance to present price structure. HOW CAN WE REDUCE OUR PRODUCTION COSTS without sacrificing product quality?
---President

RESINEX

Check the possibilities of RESINEX for cost reduction and product improvement . . . This series of aromatic resins has brought new economies into many plant operations by facilitating the extension of more costly compounding materials . . . It helps speed up incorporation in both open mill and Banbury . . . It gives better pigment dispersion and smoother stocks . . . It improves resistance to flex-cracking and cut-growth . . . It gives higher tensile with better elongation and tear properties . . . It gives better mold flow with less sticking . . . IT IS ECONOMICAL IN COST and is READILY AVAILABLE FOR ALL PURPOSES.

Write today for New RESINEX Bulletin

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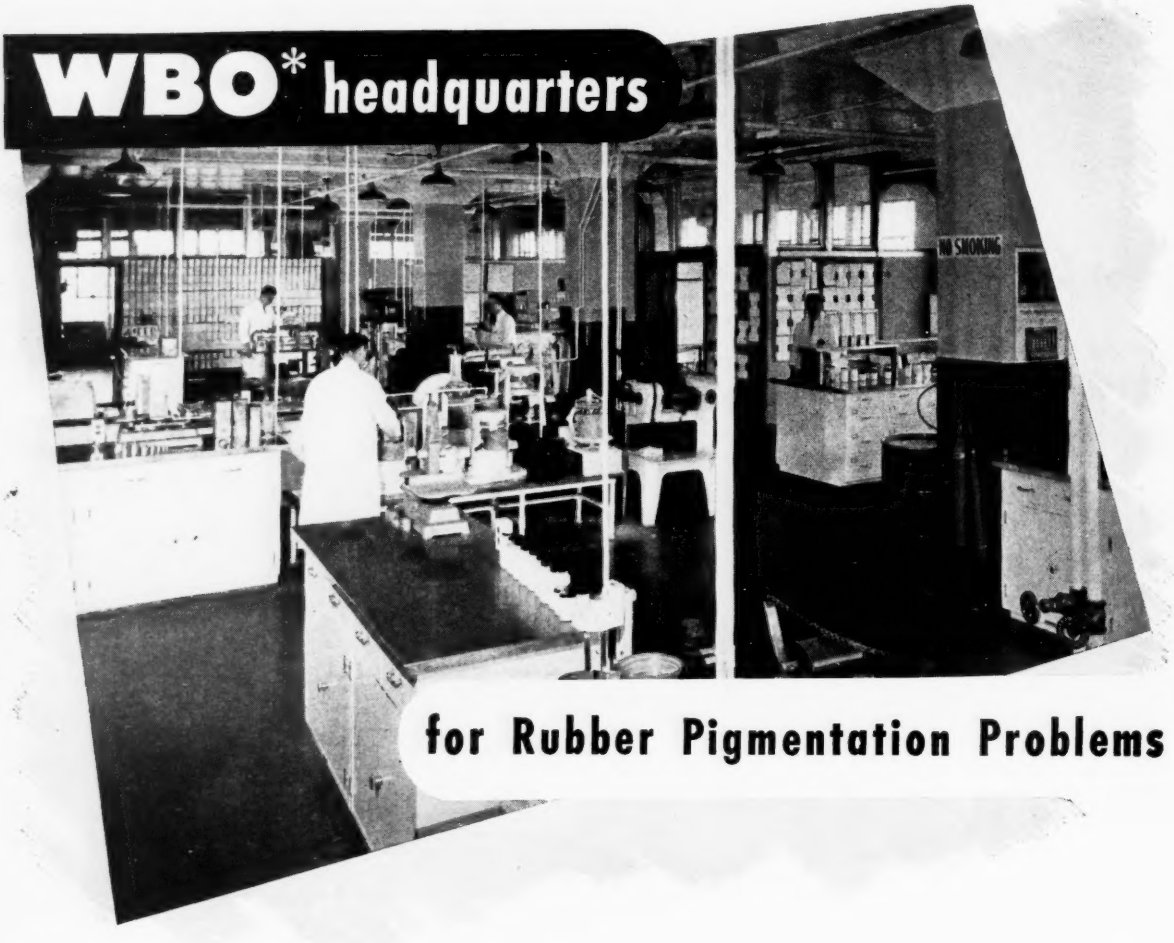
Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

TITANOX . . . *the brightest name in titanium pigments*

WBO* headquarters



for Rubber Pigmentation Problems

When you order TITANOX pigments, you get more than the finest titanium dioxide pigments to make your rubber stock white, bright and opaque. You get an invaluable technical service, the kind that will help you produce better white or tinted rubber products which will be eye-catchers and sales-makers.

The skilled technicians on our Technical Service Laboratory staff will co-operate with you in solving pigmentation problems and creating formulas for your products.

Avail yourself of this free service by writing or phoning your nearest Titanium Pigment Corporation office today.

**whiteness, brightness, opacity*

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SOLE SALES AGENT

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R. D. WOOD 3400-TON TWO-OPENING PLATEN PRESS

For

VULCANIZING and CURING
RUBBER COMPOSITION SHEET PACKING,
FLOOR TILE, and RUBBER BELTING

Newest member of the R. D. Wood "Press Family" is this Two-Opening Multiple Cylinder Type Hydraulic Steam Platen Press. Designed for vulcanizing and curing rubber composition sheet packing, or floor tile; also, with the addition of stretching and clamping units, adaptable for vulcanizing rubber belting.

Top and bottom platen members are of sectional construction. The one-piece moving platen is made from open hearth steel casting, with movement guided to assure the proper adjustment to compensate for expansion and contraction under changing temperatures. Intermediate steam platen is column guided, suspended by means of steel hanger rods, and accurately spaced with press in open position. Various press sizes and capacities can be furnished to meet product requirements. If you want more details, or engineering advice, ask R. D. WOOD COMPANY, Independence Square, Philadelphia 5, Pa.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

R.D. Wood Company

EST. 1803

Pick a Sure Winner!

Why gamble when you know the answer? PELLETEX is not a "dark horse" but the established favorite for 18 years of uniform performance.

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LEADING DUSTLESS, SEMI-REINFORCING BLACK

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PLASTICIZERS

make calendering easy

✔ Check the circulars you want and clip the list to your letterhead. Mail to:

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Chemical Products Department

910 South Michigan Avenue **Chicago 80, Illinois**

General results obtainable with INDONEX in natural and synthetic rubbers have been described in our Bulletin No. 13, while various other specific applications of INDONEX are discussed in the following Circulars:

☐ 13-1—Butyl Rubber Compounds ☐ 13-2—Butadiene-Acrylonitrile Copolymer Compounds ☐ 13-3—Neoprene Compounds
☐ 13-4—Tire Carcass Compounds ☐ 13-5—Footwear & Heel Compounds
☐ 13-6—Camel Back ☐ 13-7—Motor Mount & Bumper Compounds
☐ 13-8—Wire Jacket and other Extruded Compounds ☐ 13-9—GR-S Packing Compounds
☐ 13-10—Hose Compounds ☐ 13-11—Hard Rubber Compounds
☐ 13-12—Low Hardness Mechanical Goods ☐ 13-13—Neoprene Mechanical Goods

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CHEMICAL PRODUCTS

Biggs

VULCANIZERS and DEVULCANIZERS Have Served the Rubber Industry for More Than 45 Years

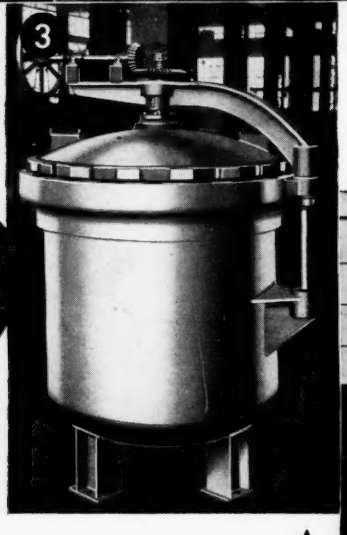


Fig. 1—15-ft. diameter by 45-ft. long horizontal vulcanizer with quick-opening door for vulcanizing rubber linings in large storage tanks. *Fig. 2*—Biggs vulcanizer with special heating manifolds and circulating fan; all sizes, various working pressures.

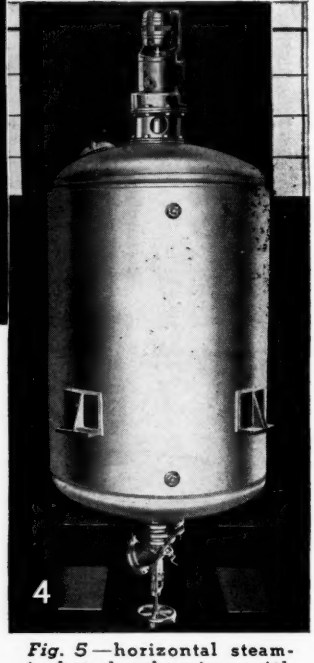
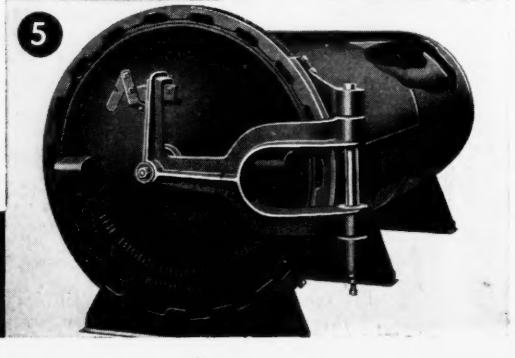


Fig. 3—vertical vulcanizer with quick-opening door. Door is handled by self-contained arm and gear-operating mechanism. Hand or motor operation.

Fig. 4—high pressure heavy duty jacketed vertical devulcanizer with special agitator. Furnished in various sizes.

Fig. 5—horizontal steam-jacketed vulcanizer with hinge type quick-opening door; all sizes, for various working pressures. Welded construction throughout.

BIGGS-built vulcanizers and devulcanizers have occupied a prominent place in the development of the rubber industry since its inception. For more than 45 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers to meet various requirements of the reclaim experts. . . . It is a far cry from the old days of bolted doors and riveted construction to Biggs modern all-welded units with quick-opening doors. Biggs vulcanizers and devulcanizers are available in all sizes and for various working pressures — with numerous special features. *Write now for our Bulletin 45.*



THE Biggs BOILER WORKS CO.
1007 BANK STREET, AKRON 5, OHIO, U.S.A.

★ *A smooth, stable,* **DUSTLESS** *dispersion of* **ZINC STEARATE** *in water in concentrated form*

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AQUAZINC is particularly convenient for surface application of Zinc Stearate. When diluted with 8 to 20 parts of water, it can be applied by spray or bath.

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Chemical Manufacturers
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PEELS OFF *clean*

Take a lesson from the banana! Much of its popularity is due to the fact that it peels off clean. That same virtue is vital to gum rubber in sheets. And the answer to that is BRATEX Holland Cloth. Before or after vulcanizing, BRATEX peels off clean — it never sticks or flakes.

BRATEX
RUBBER HOLLAND

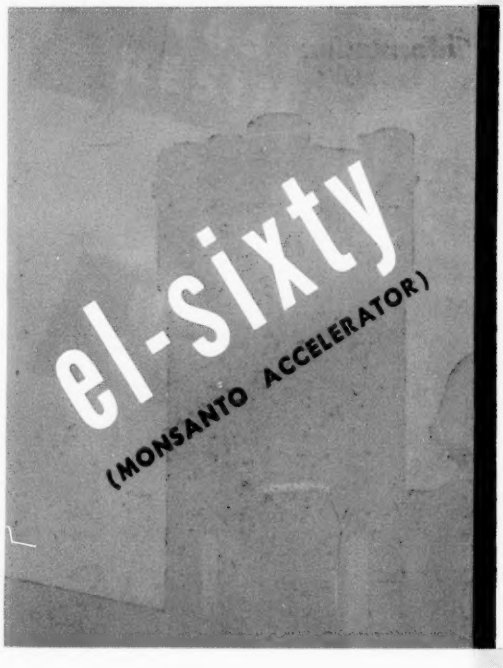
Available in three qualities, 20, 30 or 40 inches wide, in 100 and 250 yard rolls. Special size rolls to order.

Write for Samples and Prices

THE HOLLISTON MILLS, INC.

NORWOOD, MASSACHUSETTS

Monsanto's El-Sixty* offers excellent acceleration for all types of rubber goods — from tires, tubes and all mechanical goods to the finest drug sundries. It may be used alone or activated with Guantal,* Guanidines, Aldehydes, Thiurad* or Thiurams. Manufacturers of rubber goods specify El-Sixty because of these outstanding characteristics:



1. Safe handling.
2. Wide versatility.
3. Good in light and colored stocks.
4. Affected little or not at all by retarding pigments.
5. Excellent in pure gum or reclaim stock.
6. Most stable mercapto accelerator in latex. Causes no thickening in tanks.

For samples or further information on El-Sixty or other Monsanto chemicals for the rubber industry write to MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Building, Akron 8, Ohio.

Reg. U. S. Pat. Off.

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SERVING INDUSTRY... WHICH SERVES MANKIND

BALDWIN
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STEAM
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- Original Design
- Accurate Workmanship
- Ample Strength—Low Deflection
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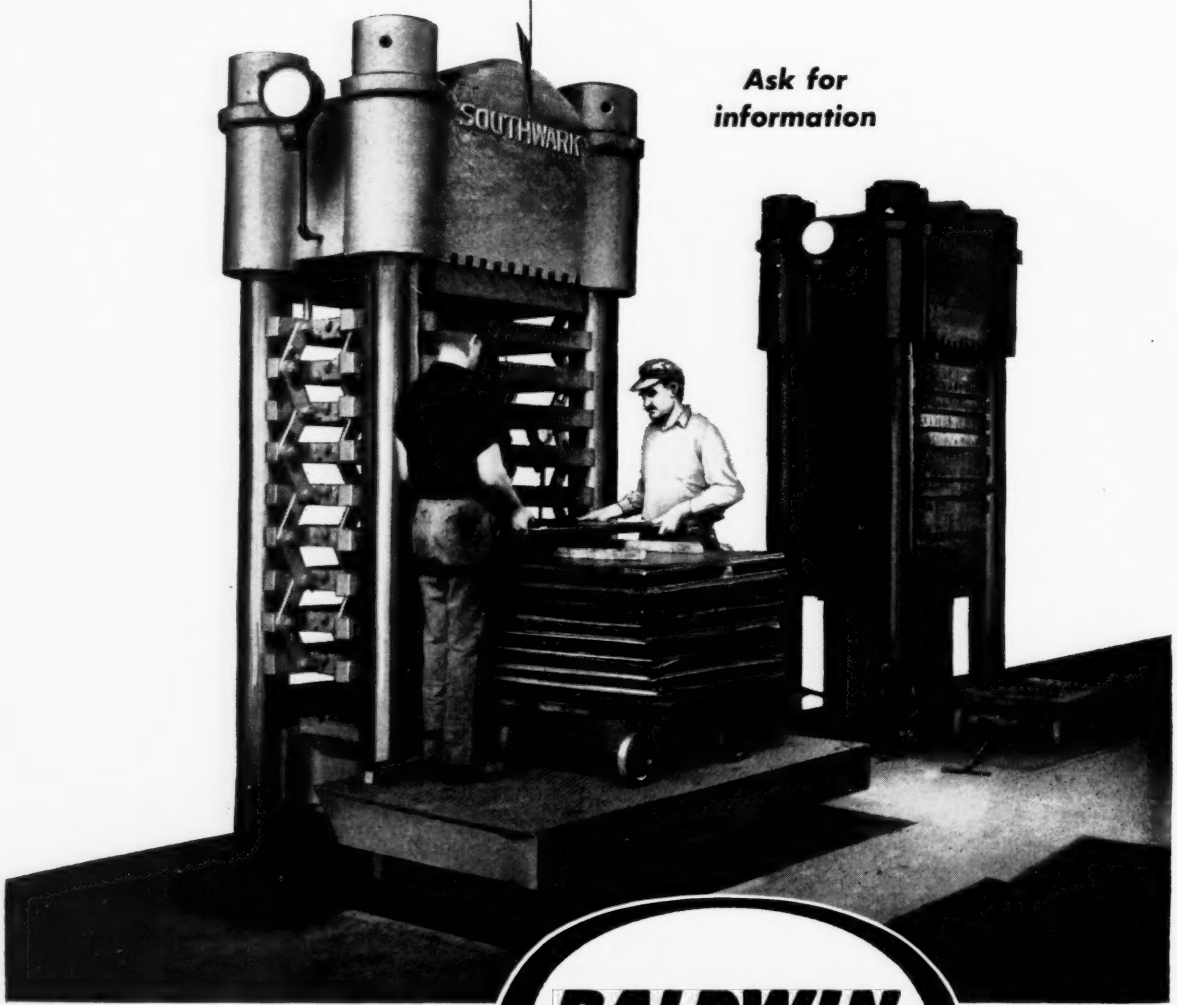

BALDWIN
HYDRAULIC
PRESSES

The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Philadelphia, New York, Boston, Chicago, Cleveland, St. Louis, Birmingham, Houston, San Francisco, Seattle, Washington, Pittsburgh.

Inexpensive Dark Resins

AVAILABLE FOR SHIPMENT IN QUANTITY

PARADENE #1, #33, #34, #35

Melting points range from 20° to 100° C. Readily soluble in petroleum and coal-tar (aromatic) solvents.

Used in manufacture of adhesives, concrete curing compounds, electrical insulation, floor tile, linoleum, paints and varnishes, pipe coatings, textile coatings and in compounding of natural and synthetic rubber.

465 RESIN

Melting point between 105° and 120° C. Soluble in aromatic solvents and partially in petroleum solvents.

Used in the manufacture of adhesives, box toes, ethyl cellulose lacquers, impregnations, linoleum, floor tile, sealing compounds, varnishes and in the compounding of natural and synthetic rubber.

NUBA #1, #2, #3X

Melting points range from 80° to 135° C. Soluble in aromatic solvents. They are cohesive and have high molten viscosity.

Used in the manufacture of adhesives, binders, box toes, briquettes, composition insulating blocks; filling, stiffening, molding and thermal insulating compounds; leather dressings, steep-roof coatings and for compounding natural and synthetic rubber.

Write for samples and booklet describing these resins.

NEVILLE

THE NEVILLE COMPANY
PITTSBURGH, 25, PA.
Chemicals for the Nation's Vital Industries

BENZOL • TOLUOL • XYLOL • TOLLAC • NEVSOL • CRUDE COAL-TAR SOLVENTS
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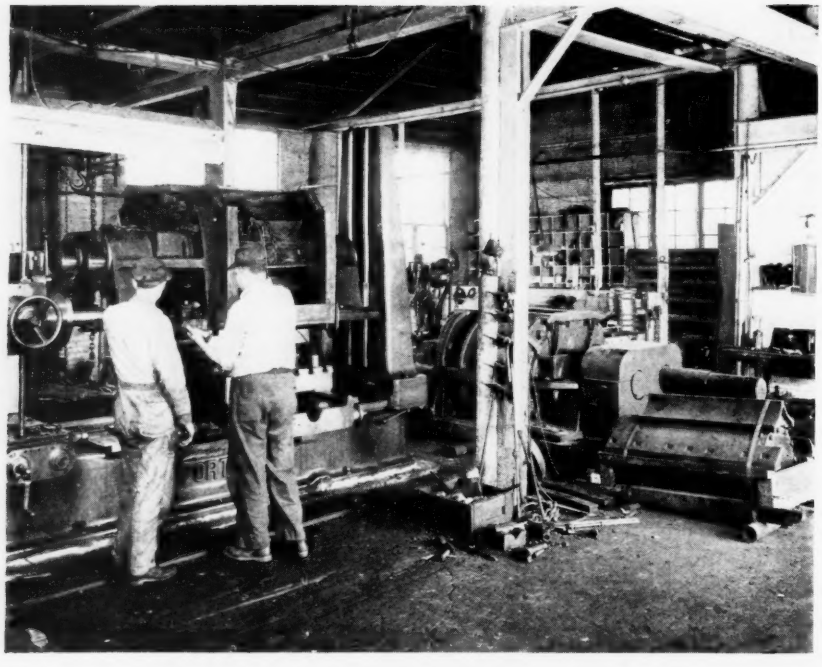


View in Our Shop. Skill, Equipment, Experience at Your Service.

Worn Banbury Mixers

Restored To Maximum Efficiency

TO EVERY Banbury Mixer in steady use the time comes when the harsh, grinding strain takes toll in badly worn parts.

What happens then, you know, is not good. Mixing efficiency suffers: — production costs go up: — and, unless something is done, that condition goes from bad on down, even to the zero point of complete breakdown.

The thing to DO is to call us at INTERSTATE and have the worn mixer rebuilt and restored to tip-top condition. Interstate rebuilding means precision workmanship with modern facilities, guided by some fourteen years specialized experience.

It includes giving rotors and mixing chamber an amazing resistance to abrasion with our exclusive hard-surfacing method:—replacing worn rings with our own specially fabricated rings, guaranteed to stop dust leakage:—renewing bearings, oil lines, and other worn parts.

For quick estimates on rebuilding YOUR worn Banburys just write, wire or phone.

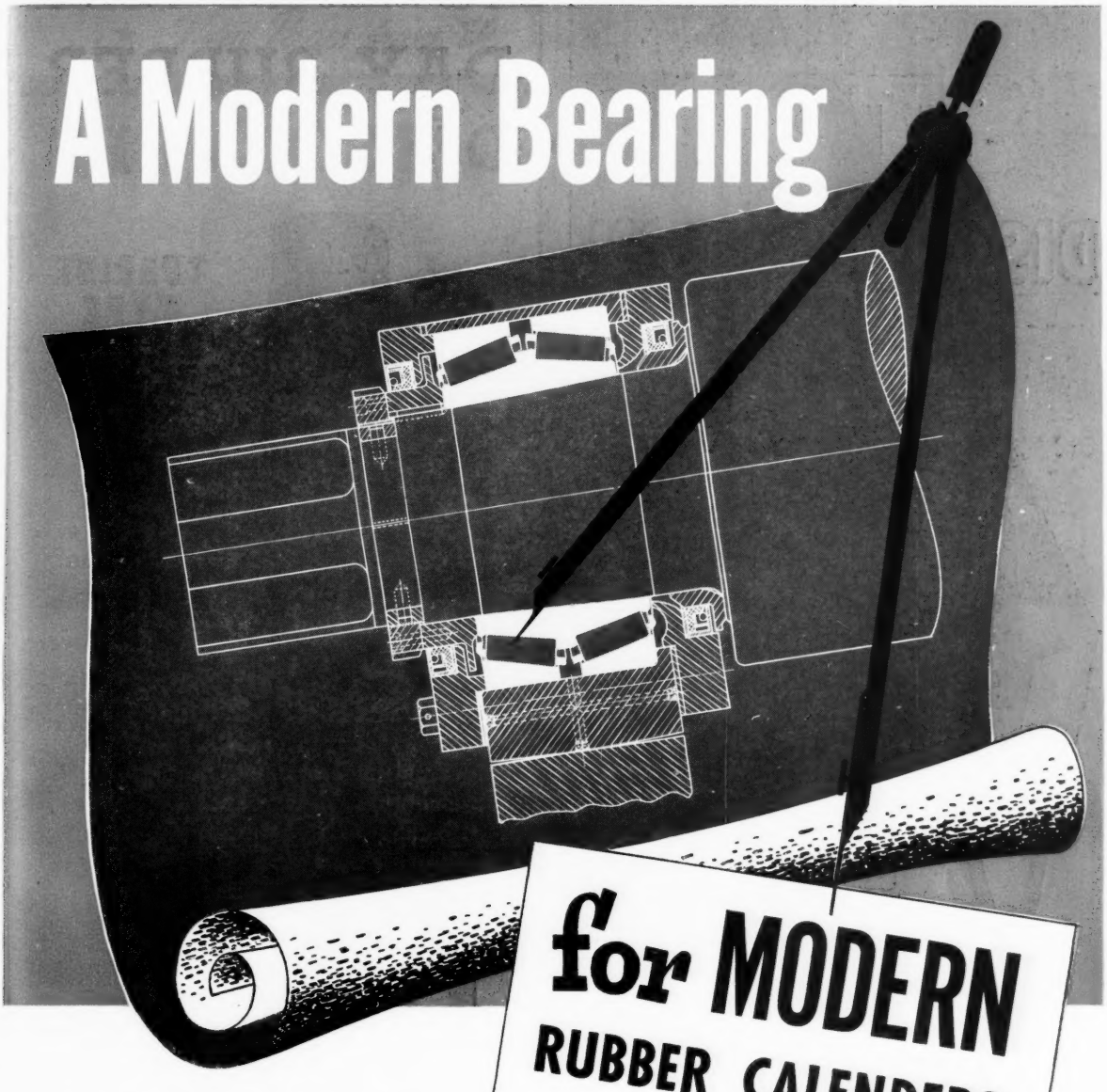
SERVING THE RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

Main Plant: 914 Miami Street AKRON 11, OHIO Phone: JE 7970

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

A Modern Bearing



for MODERN RUBBER CALENDERS

The Timken Balanced Proportion Bearing application as shown in the drawing was designed to assure greater accuracy, increased production, longer life and lower maintenance in today's — and tomorrow's — rubber calenders.

These bearings will give your calenders increased roll neck strength and rigidity; close and constant control of product thickness; maintenance of proper running clearance at any operating temperature; free rolling motion regardless of the R.P.M. of the bearing or speed of the calender rolls.

You need these bearings *now*. Consult the calender builder or our engineers regarding their application to new or existing machines. Look for the trade-mark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

48 YEARS OF ENGINEERING AND METALLURGICAL DEVELOPMENT

STOP DISCOLORATION

with

V·1·N

The New Stabilizer V·1·N

Stabilizes Vinyl Chloride Plastics and coatings against heat and exposure discoloration.

Yields

Transparent
Colorless
Odorless
Heat Resisting
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DAY RUBBER DISSOLVERS

TURBINE TYPE

300 Gallon dissolver with vertical motor drive

The wide range of viscosities which this dissolver will handle, together with a variety in design of the agitator, provides a wide range of applications. When extreme violent mixing action is required, they are equipped with diffusion rings insuring adequate mixing action in the shortest possible time.

Built in working capacities of 80, 150, and 300 gallons.

THE J. H. DAY CO.

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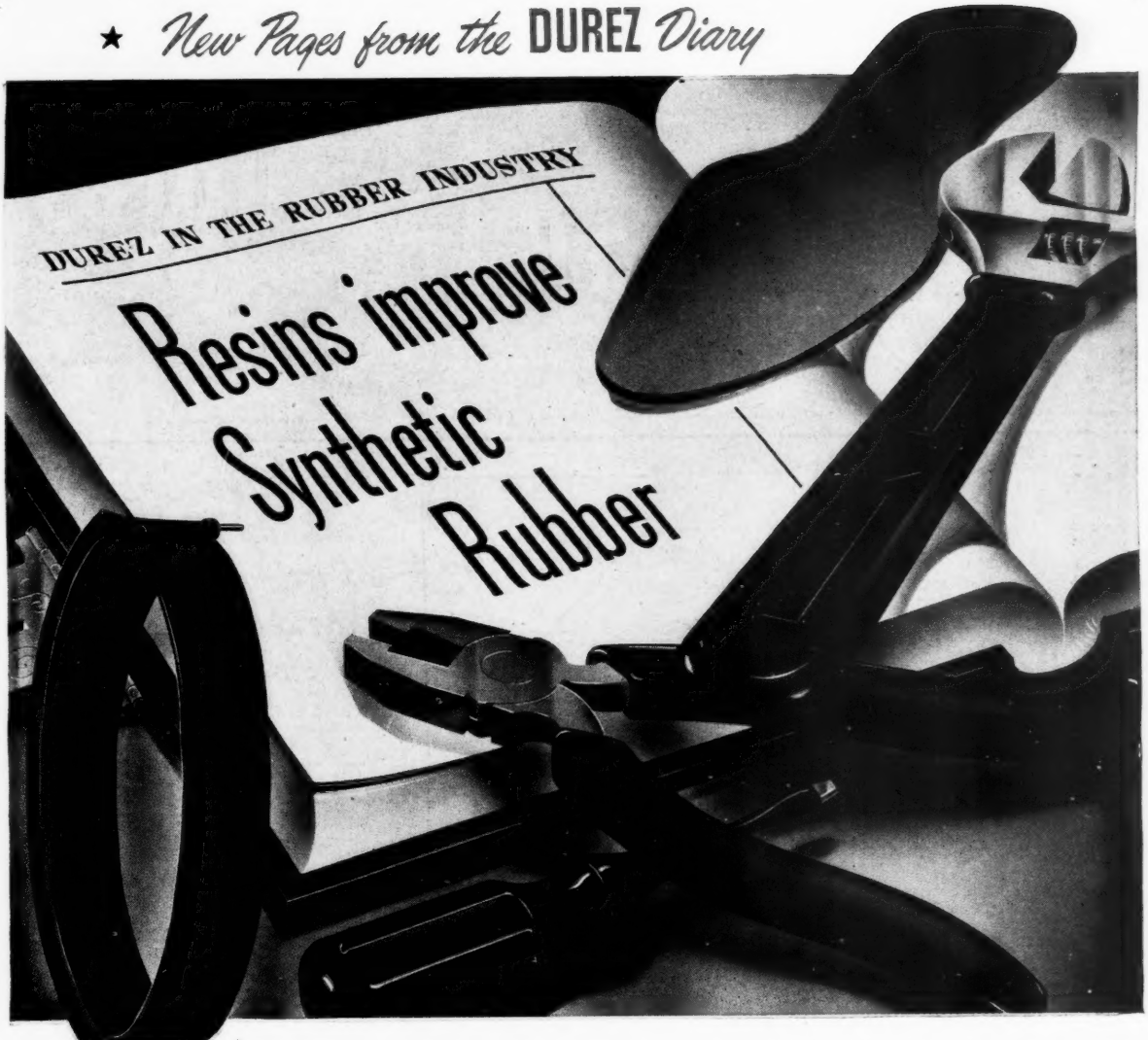
★ *New Pages from the* **DUREZ** *Diary*



● To the casual observer, everything looked fine for synthetic rubber when tires began to set mileage records.

But elsewhere there was trouble. The successful use of synthetics in producing the much-needed hard and semi-hard rubber stocks was baffling the industry's technicians. Tree rubber, with its high natural plasticity, was easy to mill with added carbon black and other materials. Until recently, however, the peculiar stiffness of synthetic rubber made it very difficult to "load" these stocks sufficiently.

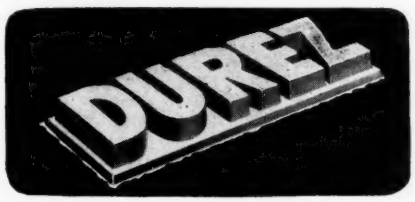
So Durez engineers joined the search, bringing in twenty-six years of specialized experience with the phenolic plastics. Out of this collaboration came Durez thermosetting phenolic resins with the very useful ability to *soften* synthetic rubber in milling.

The Durez resins, being completely compatible with synthetic rubber, also *reinforce* it. Resultant stocks possess great tensile strength, a high degree of hardness, excellent elongation, improved abrasion resistance, and flexibility at low temperatures.

Broad new fields of utility have been opened to the synthetic rubbers through formulation with Durez resins. Synthetic rubber propeller de-icer rings are light in weight, yet resist fracture. Synthetic shoe soles are stiffer and harder, and wear longer. Synthetic handles on screw drivers and other tools prevent electrical shock. Other important applications are now in process.

Send for new folder "Durez Resins for the Rubber Industry."

Durez Plastics & Chemicals, Inc., 279 Walck Road, North Tonawanda, N. Y.

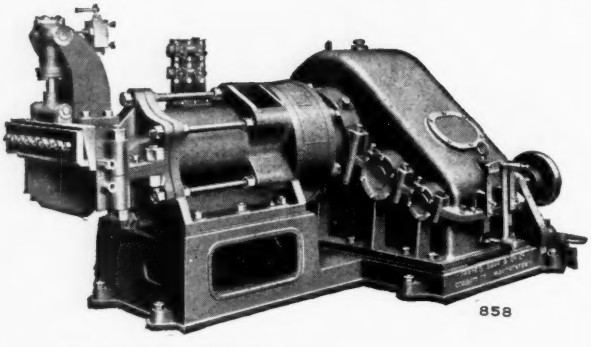


PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC RESINS THAT FIT THE JOB

SHAW RUBBER EXTRUDERS



An 8-inch Shaw Extruder
for Tyre Tread Production

We have been making all types of extruders for the rubber industry since 1879

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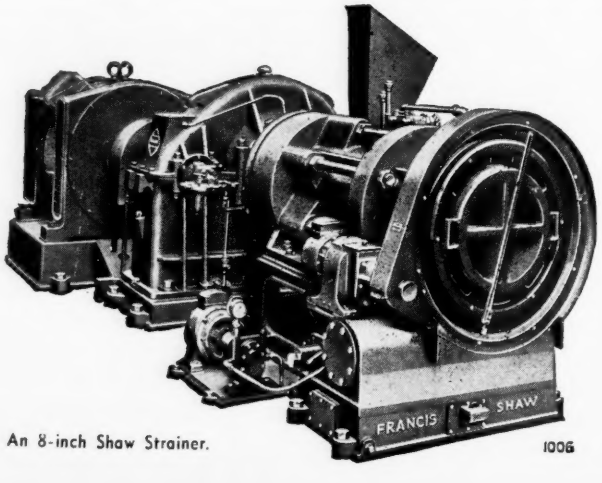
Your enquiries will receive the benefit of over 65 years experience in the design and manufacture of sound machines.

WE CAN EQUIP COMPLETE TYRE PLANTS AND GENERAL RUBBER PROCESSING FACTORIES WITH MACHINERY PRODUCED ON MODERN PLANT BY SKILLED WORKMEN AND TECHNICIANS.



An 8-inch Shaw Strainer.

FRANCIS SHAW & CO. LTD. MANCHESTER 11 ENGLAND

R-133

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FLEXTENDER 3A
(VULCANIZED OIL)

A RUBBER SUBSTITUTE and PROCESSING AID—

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SUPERIOR PHYSICAL PROPERTIES

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ESPECIALLY USEFUL IN EXTRUDED PRODUCTS —FLOORING COMPOUNDS AND MIDSOLING STOCKS

Samples gladly furnished

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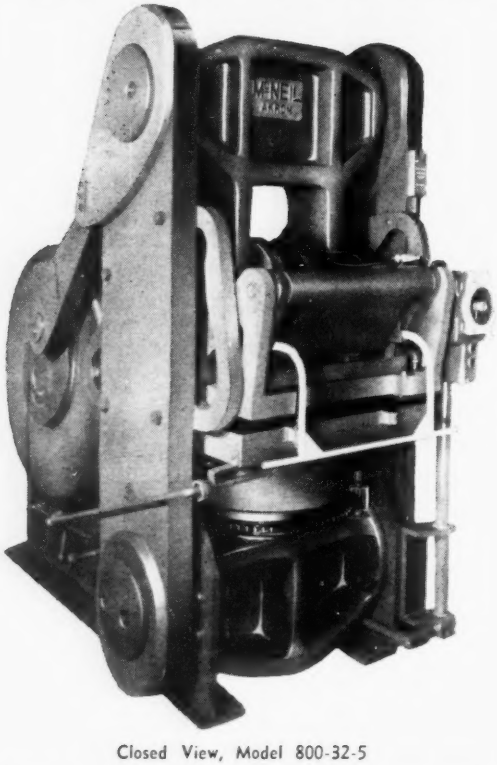
ESTABLISHED 1919 MURRAY HILL 2-3558

NEW! MECHANICAL GOODS PRESS THE McNEIL MODEL 800-32-5

The first of a new line of platen presses



Closed View, Model 800-32-5

MOTOR OPERATED — NO HYDRAULIC.

800,000 POUNDS TOTAL PRESSURE.

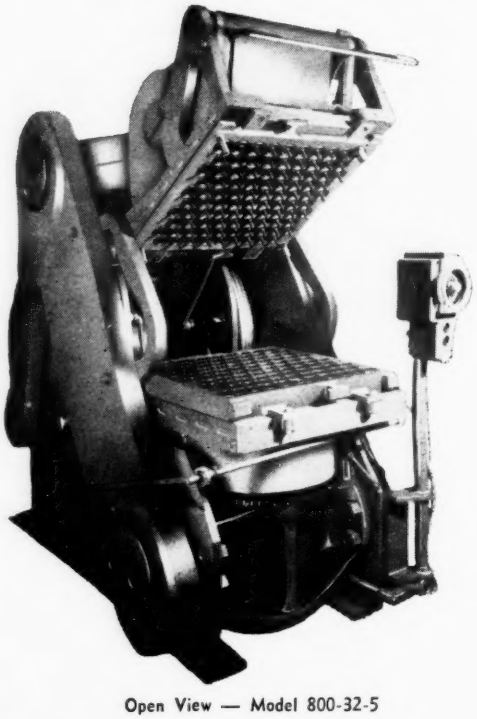
32x32 DRILLED STEEL STEAM PLATENS.

780 POUNDS PER SQUARE INCH PLATEN PRESSURE.

SIMPLE SPEEDY ADJUSTMENT OF LOWER PLATEN.

ADJUSTMENTS FOR MOLD LOADINGS ZERO TO 400 TONS.

RANGE OF MOLD THICKNESS 1" MINIMUM TO 5" MAXIMUM OR 2" MINIMUM, 6" MAXIMUM.



Open View — Model 800-32-5

We have, in this modern, fully automatic platen press, completely eliminated hydraulic service, either water or oil. No rams to pack; no valves to service; no pumps; no accumulators. One high torque motor is the only power requirement for press operation.

Our own design of timer automatically controls curing time and any series of bumps which may be required. Direct reading load gauge on upper right hand side arm simplifies adjustment of press to obtain any predetermined mold loading. After the first cure, loads can be increased or decreased almost instantly. Adjustment can be made for mold loadings from zero to full 400 tons, using any pressure which best suits type and size of job.

Molds are fastened to upper and lower steam platens, but changes can be easily and quickly made. Knockout equipment can be furnished for rubber valve stems or other types of products which require automatic ejection.

All the experience and engineering skill of the McNEIL organization is at your call to help you increase efficiency and speed while lowering production costs. For tomorrow's production, check with McNEIL today.

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AUSTRALIA and NEW ZEALAND — Chas. Ruwolt Proprietary, Ltd., Victoria, Australia.

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The McNEIL Machine & Engineering Co.

96 East Crosier St. Akron 11, Ohio

RUBBER WORKING MACHINERY • INDIVIDUAL CURING EQUIPMENT FOR TIRES, TUBES and MECHANICAL GOODS

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More Than 16 Ounces

in a Pint Can

?

Many manufacturers have . . . especially when the can held a development sample of Flintkote Liquid Products.

They've often found the welcome answer to a troublesome requirement for coating, laminating, saturating, bonding or other fabrication problem.

We, at Flintkote, make a broad line of liquid asphalt, resin and rubber products . . . both in aqueous dispersions and in solvent form. In addition to standard products, we've helped meet many special requirements that called for custom-made materials.

As a result, Flintkote Liquid Products find wide use in many branches of industry. Some are used for rug and carpet backing, others as paper and textile laminants and sizings, curled hair binders, or adhesives.

Chances are, in our standard line . . . or in our research files . . . there's a solution to *your* problem. If not, our technical staff will be glad to work with you, to discover what you need.

A letter outlining your problem will put our complete research, development and manufacturing facilities at your disposal.

FLINTKOTE

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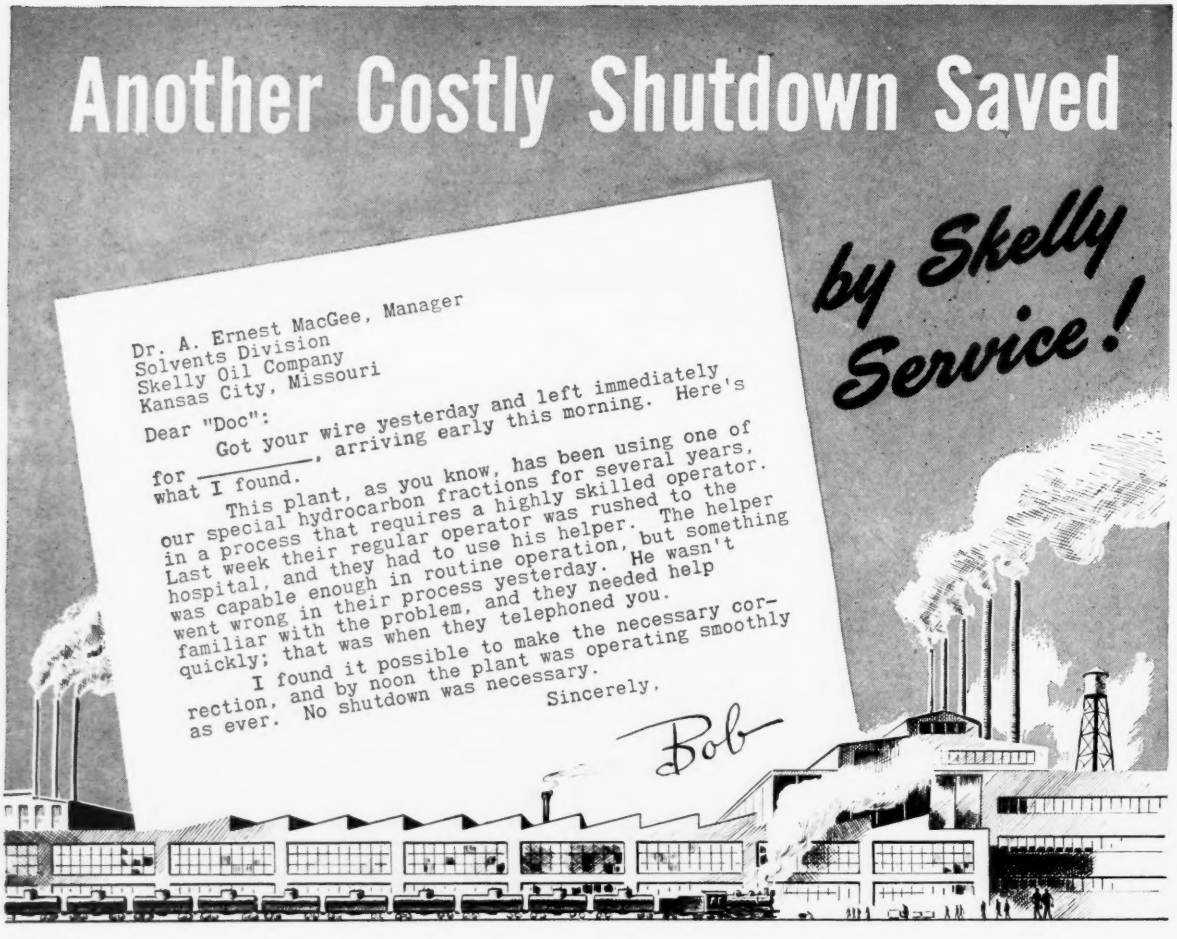
Dr. A. Ernest MacGee, Manager
Solvents Division
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Got your wire yesterday and left immediately for _____, arriving early this morning. Here's what I found.
This plant, as you know, has been using one of our special hydrocarbon fractions for several years, in a process that requires a highly skilled operator. Last week their regular operator was rushed to the hospital, and they had to use his helper. The helper was capable enough in routine operation, but something went wrong in their process yesterday. He wasn't familiar with the problem, and they needed help quickly; that was when they telephoned you.
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Bob

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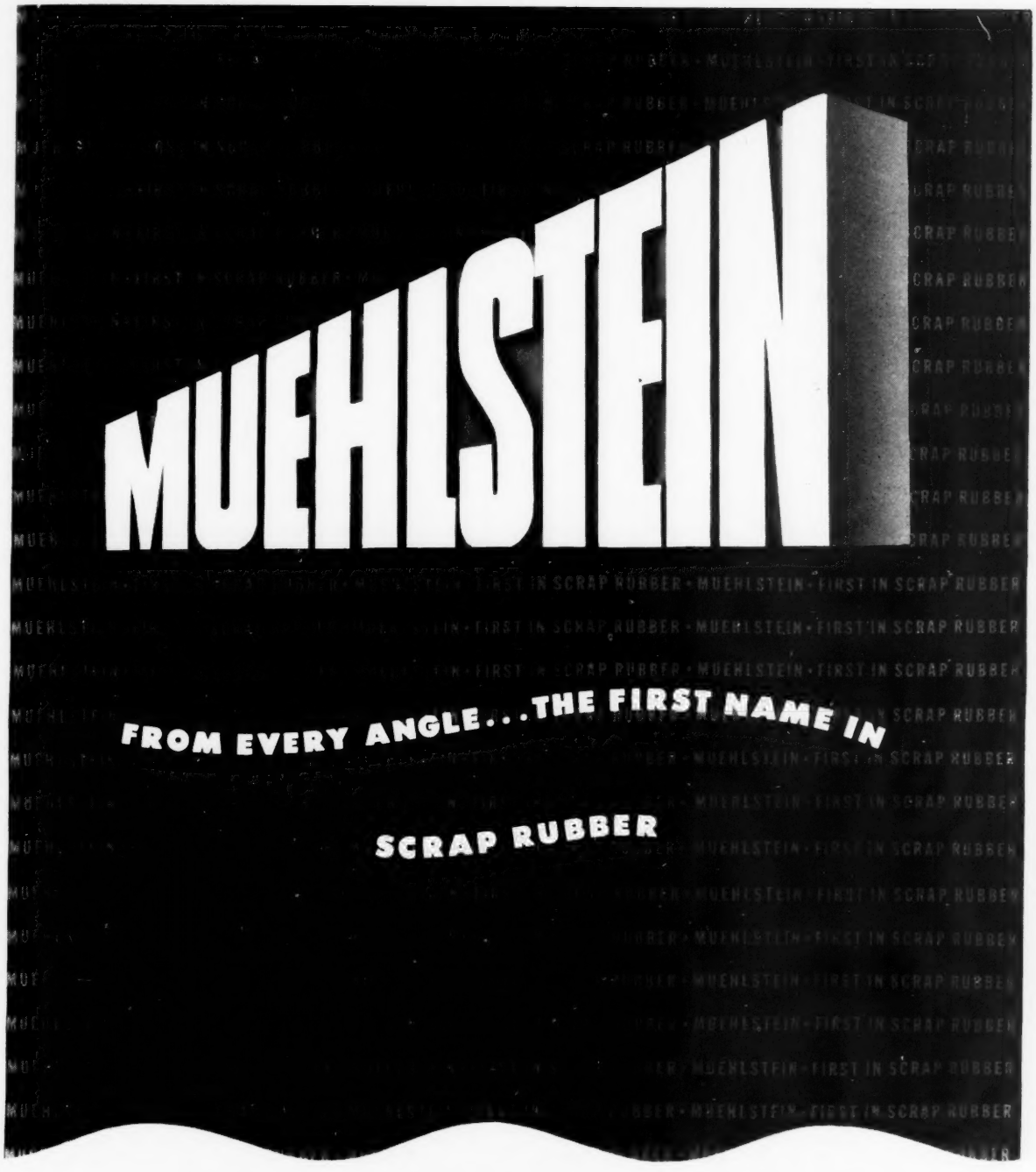

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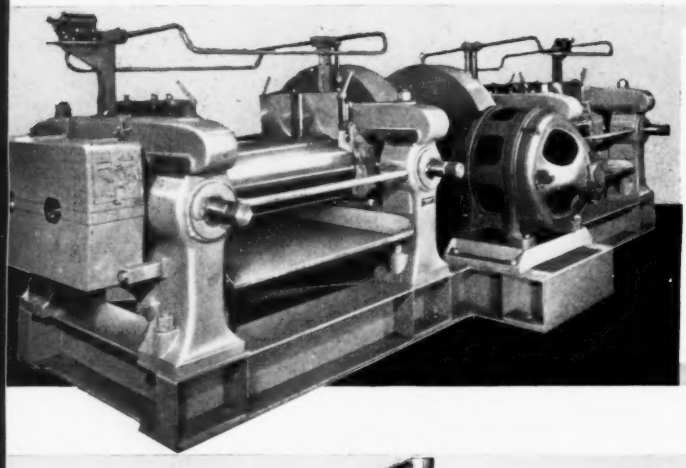

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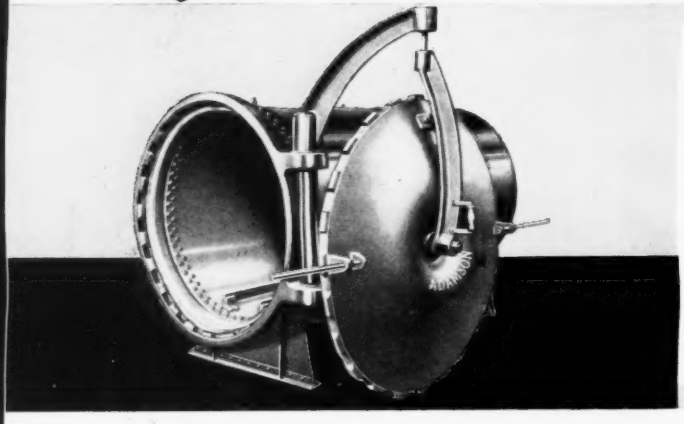

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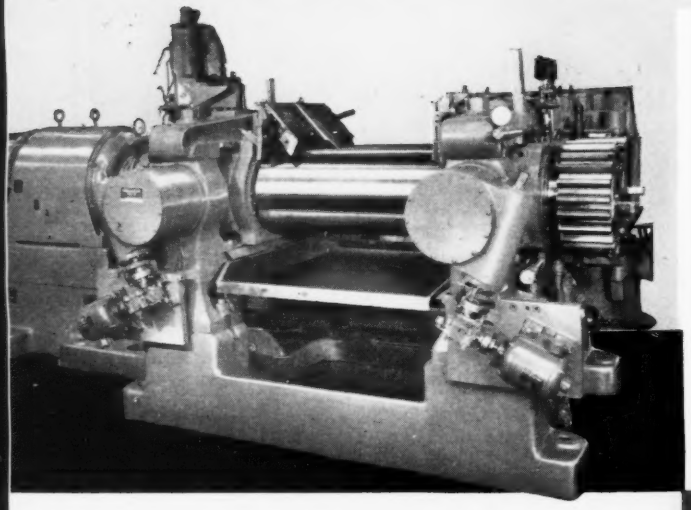

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These are built in all sizes from 6" x 16" to 28" x 84". The one illustrated is a late model (shown without gear enclosure), designed for plastics. It has rolls 20" in diameter by 48" long on the working face; flood lubricated roll boxes; tilting stock guides; motor-operated adjusting screws; stainless steel stock pan; dial indicators for front roll position; two sets of connecting gears for operating rolls at two different friction ratios, and an individual motor drive, with geared head and flexible coupling direct-connected to rear roll.

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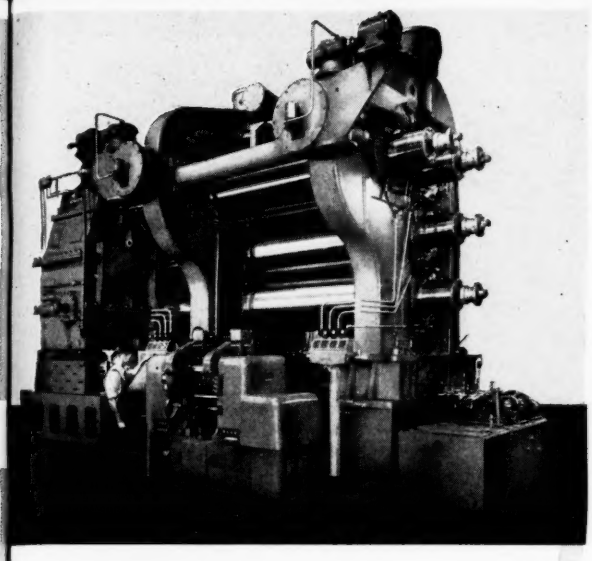

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The large Calender has four rolls measuring 36" in diameter by 92" long on their working faces. They are mounted in anti-friction bearings which are preset for precision operation at high temperature. Each roll is individually-driven from a separate gear stand. All bearings are flood lubricated from a central supply. The off-set, top and bottom rolls have individual motorized adjustment through double Cone worm reducers.

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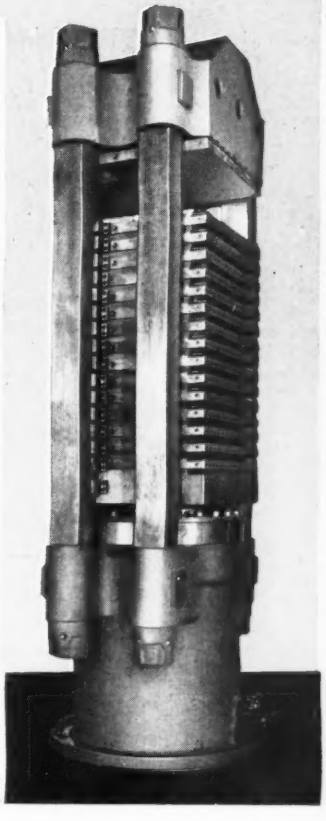

BELT PRESSES

Belt Press with two openings. Platens are 63" wide by 31' long. This Press weighs over 300 tons and will deliver 250 lbs. per square inch on the platens. It comes complete with stretchers and clamps, the latter mechanically controlled directly from the movement of the platens. Standard designs for various sizes are available.

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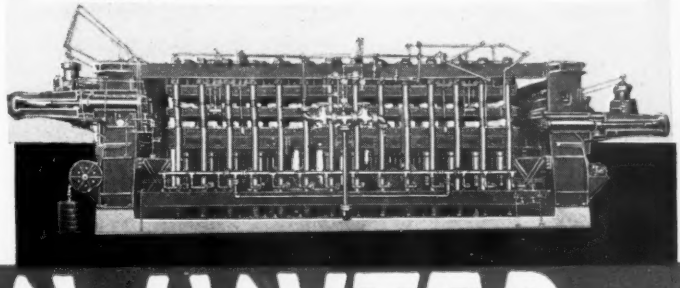

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COMPOUND COST APPROX. 8c per lb.

TEST No.·8312
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Use of Barrett BRS 700 rubber softener, Carbonex* S tar-hydrocarbon, plastic grade, and Cumar* resin, DX grade, to produce an inexpensive GR-S black compound stock with a Shore A hardness of 90 is shown in the following recipe and test data.

RECIPE	WEIGHT BASIS
GR-S	100.00
Carbonex* S tar-hydrocarbon, plastic grade	50.00
Cumar* resin, DX Grade	25.00
BRS 700	10.00
Channel Black (EPC)	50.00
Clay	125.00
Zinc Oxide	5.00
Sulfur	3.50
Benzothiazyl Disulfide	1.25
DPG	0.50
Total	370.25
Compounded Mooney Viscosity at 100°C (1.9 Inch Rotor)	59
Specific Gravity	1.44
Rubber Hydrocarbon, % by Wt.	27
Rubber Hydrocarbon, % by Vol.	42
Cost per Pound	$ 0.08 (Approx.)

Cure at 316° F (70 Lb)—10 Minutes

Tension Data:	Unaged	Aged 24 Hrs. @ 100° C
Stress—P.S.I.—at 300%	950	—
Tensile—P.S.I.	1100	1200
Elongation—%	400	230
Hardness—Shore A	90	96

The recipe shown above combines the good processing and reinforcing properties of Carbonex* tar-hydrocarbon with the extending properties of Cumar* resin, and the softening and extending action of BRS 700. This compound, characterized by high hardness, extrudes and molds exceptionally well in spite of its low cost. Inquiries respecting the use of Barrett Rubber Compounding Materials are invited. Send for booklet and Rubber Laboratory Releases.

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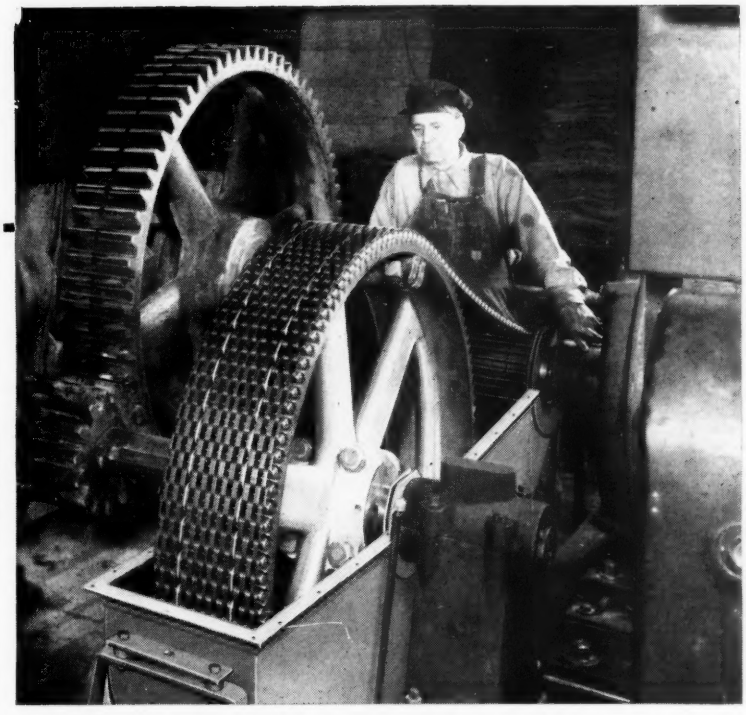
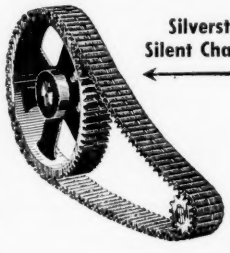
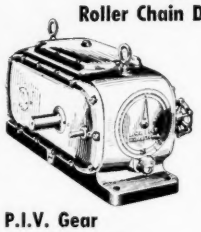




Silverstreak Silent Chain Drives

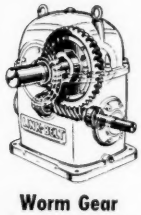
Silverlink Roller Chain Drives



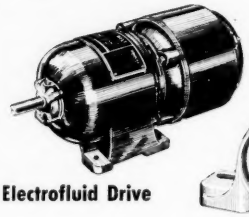
P.I.V. Gear Speed Changer

Herringbone Gear Speed Reducer

Motorized Helical Gear Speed Reducer



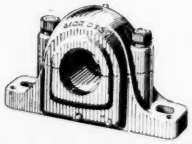
Worm Gear Speed Reducer



Electrofluid Drive

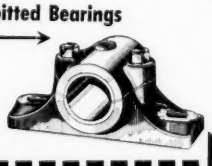
Ball Bearing Mounted Units

Unmounted Ball and Roller Bearings



Roller Bearing Mounted Units

Babbitted Bearings



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September, 1947

Volume 116 Number 6

A Bill Brothers Publication

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NATURAL & SYNTHETIC

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INDIA
RUBBER WORLD
NATURAL & SYNTHETIC

Volume 116 | New York, September, 1947 | Number 6

Developments and Improvements in Methods of Stress-Strain Testing of Rubber

J. W. Schade[1] and F. L. Roth[2]

THIS article is one of the several presented before the A. S. T. M. Symposium on Rubber Testing, held in connection with the fiftieth annual meeting of that Society in Atlantic City, N. J., June 16-20, 1947. The symposium, sponsored by Committee D-11 on Rubber and Rubber-Like Materials, attempted to cover the work that has been done with regard to the physical and chemical methods of test, both on synthetic and natural rubbers, making available to industry the accomplishments of government and industry during the period of the war, when secrecy had to be maintained. All of the papers will be published in a separate booklet by the Society some time within the next few months. EDITOR.

AT THE beginning of the government rubber program in 1942 and 1943, the methods of stress-strain testing given in A. S. T. M. Methods D15-41[3] and D412-41[4] were employed. It was generally recognized at that time that the precision of stress-strain testing of rubber vulcanizates left much to be desired. Consequently, as mentioned in the paper by W. R. Hucks,[5] the Committee on Specifications for Government Synthetic Rubbers, in order to improve the precision of existing methods and to develop better methods, established a Subcommittee on Physical Testing. The name of this subcommittee was changed in 1944 to the Subcommittee on Test Methods, and its scope was broadened to include chemical methods also. The major portion of its efforts, however, continued to be devoted to physical testing. This subcommittee comprises representatives of the Office of Rubber Reserve, the National Bureau of Standards, several rubber goods manufacturers, the synthetic rubber plants, and the Bureau of Ships. This paper deals with the accomplishments in the field of stress-strain testing emanating from the laboratories represented by this group.

Test Recipe

The first test recipe for GR-S was established early in 1943. The tentative specification for GR-S, dated February 6, 1943, designated the following recipe:

Polymer as received	100.00
Channel black*	50.00
Zinc oxide	5.0
Refined coal-tar softener	5.0
Sulfur	2.0
Mercaptobenzothiazole	1.5

Batch size to equal three times recipe in grams.

*Specify as to so-called coarse Channel Black, such as Cabot #9, Wyex, W-6, Kosmos-77, Continental-AA, or similar blacks proved to be equivalent.

[1]Government Evaluation Laboratories, Akron, O.
[2]National Bureau of Standards, Washington, D. C.
[3]Standard Methods of Sample Preparation for Physical Testing of Rubber Products, "1946 Book of A. S. T. M. Standards, Part III-B," p. 242. American Society for Testing Materials, Philadelphia.
[4]Standard Methods of Tension Testing of Vulcanized Rubber, *Ibid.*, p. 247.
[5]India RUBBER WORLD, July, 1947, p. 509.

It was soon realized that the compounding ingredients had to be better defined. In particular, the coarse channel blacks, now designated Easy Processing Channel (EPC) blacks, from different manufacturers, and even different lots from the same manufacturer, yielded markedly different stress-strain results. By May, 1943, specific channel blacks and softeners were selected by both the Rubber Reserve Co. and Office of Rubber Director. Unfortunately different brands of channel black and of softener were established as standards by these two agencies. Consequently there were two different test formulae: the WPB recipe and the recipe used in the Specifications for Government Synthetic Rubbers. Compositions made according to these two recipes are not equivalent, but the recipes have been frequently referred to as though they were interchangeable.

By the end of 1943 standard lots of all compounding ingredients used in the specification recipe had been established. In establishing standard lots of compounding ingredients, it was necessary to devise procedures which would assure that each is uniform throughout and that new ones would be equivalent to the original standard lot. These procedures have been incorporated in specifications for each ingredient. To attain the accuracy of testing necessary in the synthetic rubber producing plants, the standard lots of compounding ingredients had to meet tolerances for uniformity much smaller than those previously met by their suppliers. In

some instances as many as ten lots were produced in order to obtain one matching the original standard lot within the permissible tolerances. Thus the rubber program has had an influence even on testing in the rubber chemicals industry.

Investigations were made of other recipes including gum recipes for GR-S and GR-I, a GR-S recipe proposed by the wire and cable industry, a tube recipe for GR-I, and others. Under the best conditions of operation, all these recipes were about equally effective in differentiating polymers. The ease with which reproducible results could be obtained from various recipes, however, differed greatly. Gum recipes had the advantage of fewer compounding ingredients to be controlled, and fewer man hours were required for mixing the stocks. For GR-S, however, serious consideration could not be given to such recipes since testing equipment not common in the rubber industry was required in order to obtain accurate readings at the low stresses involved. On the other hand, because certain other recipes were more complicated than the specification recipe, they required many more standard materials, and poorer reproducibility was obtained. The specification recipes selected for GR-S, GR-I, and GR-M were adopted because they were relatively simple and yielded vulcanizates which could be tested with existing equipment. Because of the difficulty encountered by manufacturers in duplicating the quality of standard lots of those compounding ingredients which are chemical mixtures, the present recipes are being reexamined to see whether they can be further simplified or whether single chemicals can be substituted beneficially for the mixtures.

Mixing

The specification for the speed of the rolls of the six-by 12-inch rubber mixing mills at the beginning of the program was that given in Methods D15-41: namely, "The speed of the slow roll shall be 24 r.p.m. and the gear ratio 1.4, or as near that figure as is compatible with good engineering practice." Apparently, considerable license was taken in the interpretation of this specification, since a survey of the mills in use in the synthetic rubber plants, early in the program, revealed gear ratios ranging from 1.25 to 1.44 and speeds of the front roll ranging from 15.8 to 25.0 r.p.m. Tests of mixes made at the National Bureau of Standards indicated that the viscosity of the compounded stock and the properties of the resulting vulcanizates were dependent both on the gear ratio and on the speed. Recent and more comprehensive studies made at the Government Evaluation Laboratories, employing a special mill in which the speeds of the rolls can be independently controlled, substantiate the earlier work and indicate optimum reproducibility of results at the recommended gear ratio of 1.4. The current specification requires a mill with a gear ratio between rolls of 1.4 and a front roll speed of 24 ±1 r.p.m. In addition the specification includes definite tolerances for clearances between the rolls and a specific procedure for determining the clearance.

It has also been noted that the properties of a compounded stock and of the resulting vulcanizate depend on the temperatures of the batch during the mixing process. Consequently specification limits have been set for the temperatures of the mill rolls during mixing. Up to the present date the temperatures have been manually controlled since the rate of heat transfer through thick-walled rolls is too slow to permit automatic control. However new types of rolls in which the rate of heat transfer will be increased are being developed, and attempts will be made with these to obtain thermostatic control.

The present specifications for the mixing procedures allocate definite periods of time for each step in the process, such as the time of incorporation of each ingredient and the number of cuts across the stock banded on the roll. Masterbatching of many of the compounding ingredients has been suggested as a means of obtaining a higher precision of testing. The results of actual tests, however, fail to substantiate this opinion. Moreover masterbatching has a serious disadvantage in that large uniform lots are difficult to obtain. Accordingly, as suitable substitutes have been found, masterbatches have been removed from the specifications.

Since the time of aging a stock between mixing and curing also produces appreciable effects on the stress-strain properties of the vulcanizate, the time intervals between the mixing and the sheeting of the stock for molding and between the sheeting and the curing have been rigidly specified.

The temperature and humidity of the mill room during mixing have also been found appreciably to influence the properties of the cured stock. That is, the values obtained over a period of time for the properties of vulcanizates at any laboratory are dependent on the season of the year, and differences in values will be obtained by laboratories in different areas because of different climatic conditions. Similar effects have been traced to the amount of moisture in the stock during mixing and at the time of curing. That a batch of stock may gain or lose moisture during mixing can be noted from a comparison of the weight of the mixed batch with the weights of the compounding ingredients. When relatively dry ingredients are mixed on a humid day, the batch gains weight during mixing even though a portion of the ingredients is lost in the process. If ingredients containing appreciable moisture are mixed on a dry day, an unusually large loss of weight during mixing is noted. Experiments have been conducted showing that a mixed stock may gain or lose weight, depending on the storage conditions, and that the rate of cure changes with the amount of moisture gained or lost. A preliminary study made at the National Bureau of Standards indicated that for a carbon black stock and a high gum stock of GR-S, the weights of the stocks increased rapidly at first and then more slowly when stored at relative humidities of 50%, 80%, and 100%, remained nearly constant at 30%, and lost weight slowly at 0%.

Unpublished experiments conducted in the plant producing GR-M have shown that stocks of this polymer stored at relative humidity of 50% and above cured more slowly than those cured immediately after compounding; whereas those stored at 30% relative humidity or less, at several temperatures, showed no appreciable change in cure rate on storage. Thus it would seem that to obtain the most reproducible results, both for GR-S and GR-M, the compounding ingredients should be stored, the mixing conducted, and the mixed stock stored before curing, at a relative humidity of about 30%. Curiously this relative humidity is approximately the same as the average all-year indoor conditions for most cities in the United States, except those on the Gulf Coast. These facts have been recognized by the Subcommittee on Test Methods for Government Synthetic Rubbers, which committee has recommended that when air conditioning is installed in rubber mixing rooms, the equipment should be able to maintain a temperature in the vicinity of 75 to 77° F. with a tolerance of ± 3° F., and a relative humidity as low as can be maintained with refrigeration-type commercial equipment, preferably not higher than 35 ± 5%. These conditions should, of course, apply also to the storage both of compounding ingredients and of mixed stock.

Curing

The curing conditions currently specified in the Specifications for Government Synthetic Rubbers are essentially those in Methods D15-41. The B. F. Goodrich Co. laboratories found, however, that many mold lubricants affect stress-strain properties. Accordingly, to avoid this difficulty the current Specifications for Government Synthetic Rubbers require the use of polished, chromium-plated molds without mold lubricant.

Several methods were tried in order to obtain a reliable method of measuring the temperatures of the curing presses. The one selected by the Subcommittee on Test Methods involves placing thermocouples in the overflow groove in the mold during the actual curing of rubber. All couples were compared with reference couples calibrated by the National Bureau of Standards and distributed, together with instructions for their use, to the synthetic rubber manufacturing plants.[6]

Recent studies indicate that the curing operation introduces significant variations in physical properties. In order to reduce these curing variables, plans are being made to try vulcanizing test sheets in cavities cut in the press plates—a procedure which would eliminate the conventional mold. It has also been found that grain effects, resulting from flow of the stock in the mold, cause the stress-strain properties of specimens from the edges of the test sheets to be more variable than those from the center. Up to the present time attempts to reduce the flow during curing have not eliminated these effects.

Testing

In the beginning of the Program, die C of Methods D412-41 was used for cutting test specimens. It was soon found that appreciable errors in testing were introduced through inaccurate determinations of the cross-sectional areas of the specimens, chiefly because no method was specified for determining their width. Also, most of the dies supplied yielded specimens which were too wide near the ends of the reduced section. Even for dies in which the width of the reduced section was uniform for a full inch, it was difficult to locate the bench marks exactly in this area. To overcome this difficulty the length of the reduced section was increased to not less than 1¼ or more than 1⅜ inches. Since it has been found that the dimensions of a rubber specimen cut with any die depend to some extent on the hardness and resistance to cutting of the stock, the specifications relating to width were made to refer to the die instead of to the specimen, and a procedure has been introduced into the specification for measuring the width of the rubber specimens.

This procedure, developed by the Government Evaluation Laboratories, is based on measurements of the thickness, weight, and density of quarter-inch squares cut from the reduced section of the specimen. Rigid specifications for the cutting edge of the die were also adopted to obtain uniform sharpening. Because of lack of uniformity often found in the thickness of the reduced sections of the specimens, a tolerance of 0.003-inch maximum was established, and the median of three measurements, one at the center and one at each end of the reduced section, instead of the minimum, was specified for the thickness.

Considerable error was introduced through inaccurately spaced and excessively broad bench marks. This condition was corrected by adopting more detailed specifications for the marker and the procedure for applying and observing the marks.

In the production of synthetic rubber, in order to minimize storage of polymer, there was considerable incentive to obtain the test results as quickly as possible. As recognized in Methods D15-41,[3] the properties of rubber after vulcanization change with time. Studies were made to establish the minimum and the maximum aging time permissible without significant sacrifice in precision, and these intervals were incorporated in the specifications.

Although it was recognized early in the program that the stress-strain testers used in the rubber industry were introducing abnormally large and variable errors, until recently the exigencies of war prevented systematic study to determine how the machines might advantageously be modified. Nevertheless a degree of improvement in testing was achieved by the establishment of a specific calibration procedure for the machine and of specific instructions on its care, maintenance, and use. At the end of 1945 a program was undertaken in conjunction with Scott Testers, Inc., to reduce the errors introduced by the machine. This program is nearing completion. These studies, carried out at the National Bureau of Standards, indicated that machine errors of 50 to 60 p.s.i. at all loads, introduced by the pawls and the recording mechanism, may, by changes in design, be reduced to less than one-fourth of these amounts. Maintenance of machines varies greatly, and it is probable that some would be found to produce errors even greater than those measured at the Bureau. With regard to the reduction of subjective errors in measurement of elongation, little progress has been made. The ring specimen has been suggested, but the preparation of suitable specimens presents too many difficulties for control testing. The autographic machine developed by Albertoni,[7] of the Goodyear Tire & Rubber Co., was also investigated, but it, too, failed to offer a satisfactory solution for reducing the errors in measurement.

It was known from the work of Tener, Kingsbury, and Holt[8] that the stress-strain characteristics of natural rubber vary with temperature. Accordingly, investigations were made early in the synthetic rubber program to determine the effects of temperature on the properties of the test vulcanizates of GR-S, GR-I, and GR-M. Temperature correction factors were calculated from these results and included in the specification so that the acceptance limits now apply to a specific temperature, 82° F.

There has always been considerable conjecture in the rubber industry as to whether a particular specimen is representative of the vulcanizate. The tendency has been to regard specimens having the highest values for stress at failure as being typical of the inherent quality of the material, and other specimens as defective or "atypical." By statistical studies this concept was found to be erroneous. The variations found in specimens from a single sheet of vulcanizate have been found to be, in large part, an inherent characteristic of the material rather than the result of variability in testing. Early in

[6] In the discussion of this paper A. W. Carpenter requested inclusion of the detailed procedure used for measuring the vulcanizing temperatures. This procedure is essntially as follows: "See that the press temperature controller and steam trap are functioning properly. Place the regular four-cavity curing mold in the press and allow it to remain for 25 minutes with the platens closed to insure temperature equilibrium. After the mold has reached equilibrium temperature, open the press and place compounded rubber slabs in the cavities of the mold. Put a thermocouple in the overflow channel, replace the mold in the press, and close the platens. After one minute obtain the millivolts readings on a calibrated potentiometer. Take readings at two-minute intervals for at least 25 minutes to determine any fluctuation in temperature and the time taken to reach equilibrium.

"Check the press temperature in this manner at least once a week. Calibrate the thermocouples used in the molds with the reference couple calibrated at the National Bureau of Standards. Do not use the reference couple in the molds. Measure the thermal e.m.f. with a precision potentiometer having graduations of not more than 0.01-millivolts, such as Leeds & Northrup portable precision potentiometer No. 8662."

[7] George J. Albertoni, "New Autographic Machine for Testing Tensile Properties of Rubber." *Ind. Eng. Chem. (Anal. Ed.)*, July 15, 1931, p. 236.

[8] R. F. Tener, S. S. Kingsbury, and W. L. Holt, "Tensile Properties of Soft Rubber Compounds at Temperatures Ranging from —70° C. to +147° C.," Technological Papers of the Bureau of Standards, (T364), 22, 367 (1927).

Fig. 1. Apparatus for Measurements of Elongation at Constant Stress

the program the specifications included an empirical statistical procedure for selecting typical specimens. This procedure was based on the dispersion of the values observed. Recent studies have shown that it is difficult to establish any statistically sound procedure for rejection of "atypical" specimens. Consequently the synthetic rubber plants are now investigating a new procedure utilizing the median for determining the sample characteristics. This method is simple in application, reducing calculations to a minimum, and rejects no specimens as "atypical."

New Bureau of Standards Method and Machine

Since the variations in stress-strain values introduced in the testing operation are as great as those resulting from mixing and curing, an improved method of test has been under development at the National Bureau of Standards since the latter part of 1944. This method is based on the measurement of elongation at a fixed stress instead of the measurement of stress at a specified elongation during the extension of a specimen. Since in this test the elongation is measured under nearly static conditions between bench marks originally 10 centimeters apart, it is evident that much greater accuracy is attainable than can be secured by measuring between relatively rapidly separating marks originally but one inch apart.

A machine for conducting this test, shown in Figure 1, has been developed to the point that weights are applied by pressing buttons on a keyboard taken from a calculating machine; sequence timing of the various operations is controlled automatically by a suitable mechanism, and the operator conducts the entire test from a sitting position. Five specimens are cut from a sheet in a single operation and the average thickness of each specimen between the bench marks is obtained in a single reading of a dial gage. The die for cutting the specimens and the apparatus for measuring thickness are shown in Figure 2. The test is therefore much simpler in operation and requires less time to perform than the specification procedure of measuring stress at a specified elongation.

The variations introduced by this method of test are negligible in comparison with those introduced in the process of mixing and curing. By its use it has been possible to observe definite variations in the material from one part of a vulcanized sheet to another. For instance, the elongations of specimens from the edges of a sheet are usually greater than those for specimens from the center, indicating a grain effect caused by flow of the material in the mold. Since 20 specimens can be cut from a sheet, it has been possible to determine reliably the effects of aging on the stress-strain properties for single sheets. Tensile properties at failure are not measured by this test, but for control testing and for many other

Fig. 2. Die and Thickness Gage for Specimens for Use in Measurements of Elongation at Constant Stress

studies such properties are not so satisfactory as stress-strain measurements below the breaking point.

It has also been found that the elongation at a fixed load decreases with increased time of curve according to the laws of a second order reaction. That is, when the elongation at some specified stress is plotted as a function of the time of cure, the points lie on a hyperbola of the form

$$(t - t_o)\quad (E - E_\infty) = 1/K$$

where t is the time of cure, E the elongation, and t_o, E_∞, and K are constants which may be interpreted respectively as scorch time, a structure constant depending on the inherent modulus of the material, and a rate of cure constant. This relation offers considerable promise for the employment of this test in both research and control.

Control of Testing

The synthetic rubber program demonstrated that a specification alone is not sufficient to insure reproducible results either within one laboratory or among several laboratories. Modifications of the specified procedures may easily occur unless suitable means are employed to maintain a continuous check on the performance of the equipment and personnel. Such a check was accomplished in the government synthetic rubber plants through the use of uniform reference lots of rubber.

(*Continued on page 788*)

Low Moisture Absorptive GR-S

W. T. L. Ten Broeck[1] and R. D. Juve[1]

BASED on the results of previous work with natural rubber latex, which showed that a rubber with low water absorption properties required a low content of materials that are water soluble or swell in water, it was thought that a GR-S polymer of unusually low water absorption could be made by close control of coagulation conditions. Several years ago a method of GR-S coagulation which resulted in a polymer of comparatively low moisture absorption was developed on a laboratory scale at Goodyear. At that time, however, the urgency of GR-S output for tires discouraged manufacture of such a polymer in the Rubber Reserve plants because the high dilution essential to the product required large tank capacity.

The low moisture absorption requirements of applications in the wire and cable industry have renewed interest in the preparation of low moisture absorption polymers. In a recent article Brady[2] described GR-S-65 and GR-S-AC, two polymers which have been offered to the wire and cable trade by Rubber Reserve. These two polymers have been acceptable for most applications in the wire and cable industry, but a need has existed of lower moisture absorption GR-S for special jobs. An experimental lot of GR-S of low moisture absorption has been prepared under the number X-361 for evaluation in the specialty field.

Laboratory Studies

Early laboratory work showed that in order to obtain a polymer with low water absorption properties it is necessary not only to avoid in so far as possible the introduction of new water soluble materials during coagulation, but also to remove to a large extent during coagulation the water soluble material present in the latex.

This removal was accomplished by diluting the latex with fresh water to less than 5% solids, avoiding the use of any recirculated serum, and then using a dilute alum solution for coagulation.

The data in Table 1 show the effect of variation in coagulant and dilution upon the water absorption and ash content of the GR-S polymer obtained.

TABLE 1. COAGULATION OF GR-S LATEX

Coagulant	Latex Solids %	Water Absorption Mgs./S.q Cm. (20 hrs. at 70° C.)	Ash Content %
Ethyl alcohol	30	2.1	0.29
Salt/acetic acid	19	6.2	0.56
Salt/acetic acid	5	5.6	**0.67**
Alum	15	2.0	0.48
Alum	4	1.4	0.40

The use of salt results in higher water absorption and higher ash content because of the salt occluded in the polymer. With alcohol as the coagulant no new non-volatile water soluble material is introduced, but because of coagulation at the high solids the water soluble materials are not washed out and the water absorption is not outstandingly low. The effect of dilution before alum coagulation indicated that improvement in water absorption properies might be made by closer control of coagulation conditions.

When the dilute alum method was applied in pilot-plant coagulations, with care to obtain rapid mixing and to avoid any excess of coagulant, products of low moisture absorption were obtained. In Table 2 water absorption figures obtained by the special coagulation are compared to those of plantation rubbers.

TABLE 2. WATER ABSORPTION COMPARISONS

Type of Rubber	Water Absorption Mgs./Sq. Cm. (20 Hrs. at 70° C.)
GR-S—salt/acid—regular	4.6 —9.3
Alum, low solids	0.51—0.95
Plantation—crude	2.5 —3.7
Deproteinized	0.54—0.70

Preparation of X-361

The principle of coagulating highly diluted latex with a dilute solution of alum was applied on factory equipment at the Goodyear-Akron Rubber Reserve plant to provide enough polymer for preliminary evaluation in wire and cable applications. Analysis of the resulting polymer gave the data shown in Table 3. The analyses were made at the Goodyear-Akron Rubber Reserve laboratory.

TABLE 3. ANALYTICAL DATA

	X-361	GR-S-AC Spec.	GR-S*
Total ash	0.41%	1.00% max.	0.86%
Water soluble	0.11%		
ETA extract	5.87%	10.0 max.	6.85
Fatty acid	3.75	3.75—6.00	4.83
Soap	0.05	0.01 max.	0.12
Volatile matter	0.02	0.75 max.	0.24

*Average data for Goodyear-Akron, Jan., 1947, production.

Physical Properties of X-361

Physical test data obtained on X-361 in the Rubber Reserve test recipe are shown in Table 4. The tensile, elongation, and modulus of X-361 meet the specifications for GR-S-AC.

TABLE 4. PHYSICAL TEST RESULTS

Compounding Recipe

	Parts
Polymer	100
EPC Black	50
BRT #7	5
Zinc oxide	5
Sulfur	2
Captax	1.5

	X-361	GR-S—AC Spec.	GR-S*
ML/212 (raw polymer)	60	45-55	50
ML/212 (compounded)	70	65 max.	58.5
Tensile (lb/in²)			
Cured 90 min. at 292° F.	2980	2700 min.	50/292—3194
Elongation (%)			
Cured 90 min. at 292° F.	620	500 min.	50/292—636
300% modulus			
Cured 25 min. at 292° F.	350	250—550	462
Cured 50 min. at 292° F.	750	650—950	1010
Cured 90 min. at 292° F.	1010	950—1350	1389

*Average data for Goodyear-Akron, Jan., 1947, production.

Although the data obtained in the Rubber Reserve test recipe showed X-361 to be of somewhat lower modulus than regular GR-S, tests in two typical continuous vulcanization formulations did not show any great variation between the rate of cure of X-361 and regular GR-S. Continuous vulcanization requires cures in the range of 10 seconds at 380° F. Since the highest temperature obtainable in the laboratory curing presses was 305° F., this temperature had to be used for curing with increased curing time. These data are shown in Table 5.

Water Absorption

The water absorption of a sample of X-361 is com-

[1]Goodyear Tire & Rubber Co., research laboratory, Akron, O.
[2]India RUBBER WORLD, 115, 4, 509 (1947).

TABLE 5. TESTS IN CONTINUOUS VULCANIZATION RECIPES

Compounding Recipe A	Parts	Compounding Recipe B	Parts
Polymer	100.00	Polymer	100.00
Hard hydrocarbon	30.00	Stearic acid	1.00
AgeRite antioxidant	1.00	Sunproof antioxidant	3.50
Zinc oxide	3.00	Hard hydrocarbon	30.00
FT Black	50.00	AgeRite antioxidant	1.50
Sulfur	1.50	Zinc oxide	10.00
EPC Black	25.00	Magnesium oxide	1.00
Selenac	1.25	FT Black	25.00
Captax	1.25	Whiting	65.00
		Hard clay	25.00
	213.00	Litharge	5.00
		Sulfur	0.50
		Selenac	1.50
		Tuads	3.00
			272.00

	Compounding Recipe A		Compounding Recipe B	
	X-361	Standard GR-S	X-361	Standard GR-S
Best Cure	8'/305°	8'/305°	15+'/305°	15+'/305°
Tensile (lb/in²)				
Cured 3 min. at 305° F.	No cure	No cure	556	406
Cured 5 min. at 305° F.	1516	1560	766	580
Cured 8 min. at 305° F.	1206	1193	810	730
Cured 15 min. at 305° F.	1336	1133	850	736
Elongation (%)				
Cured 3 min. at 305° F.	No cure	No cure	1120	1153
Cured 5 min. at 305° F.	740	710	1023	1116
Cured 8 min. at 305° F.	556	610	926	990
Cured 15 min. at 305° F.	510	475	873	903
300% Modulus (lb/in²)				
Cured 3 min. at 305° F.	No cure	No cure	70	43
Cured 5 min. at 305° F.	370	396	106	63
Cured 8 min. at 305° F.	506	440	140	113
Cured 15 min. at 305° F.	660	630	153	126
500% Modulus (lb/in²)				
Cured 3 min. at 305° F.	No cure	No cure	146	106
Cured 5 min. at 305° F.	690	660	193	143
Cured 8 min. at 305° F.	950	836	246	206
Cured 15 min. at 305° F.	1340	....	263	230
Shore Hardness—A-B				
Cured 3 min. at 305° F.	No cure	No cure	44-27	37-23
Cured 5 min. at 305° F.	56-38	60-40	49-32	45-30
Cured 8 min. at 305° F.	60-43	62-43	52-34	50-33
Cured 15 min. at 305° F.	64-46	67-47	52-34	53-35

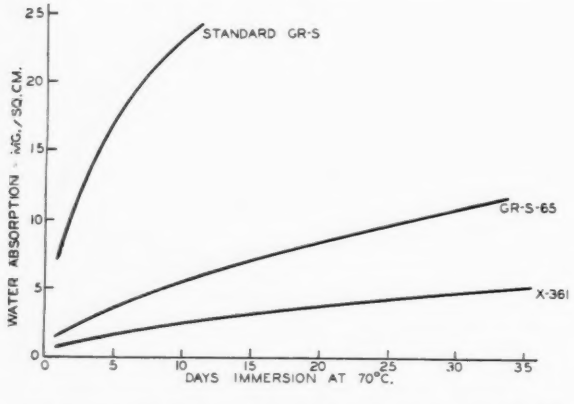

Fig. 1. Comparison of Water Absorption Properties: Standard GR-S, GR-S-65, and X-361 GR-S

TABLE 6. WATER ABSORPTION OF CURED X-361

Compounding Recipe

	Parts
Polymer	100.0
Stearic acid	1.0
Zinc oxide	0.5
Captax	1.5
Sulfur	2.0
	105.0

Days Immersion in Water at 70° C.	Water Absorption—Mgs/Sq. Cm. Compounded and Cured	Raw Polymer—Uncured
1	0.61	0.70
2	0.98	1.00
5	1.41	1.55
8	1.86	2.10
13	2.31	2.70
16	2.48	3.23
19	2.73	3.55
23	3.03	4.05
30	3.37	4.95

pared to the water absorption of GR-S-65 and that of regular GR-S in Figure 1. Water absorption data were obtained by the Rubber Reserve specification method. The curve obtained for the sample of X-361 tested is substantiated by the fact that in a separate series of determinations the average water absorption of 65 bales of X-361 was 0.70 mg sq.cm. after 20 hours and 0.97 mg. sq.cm. after 44 hours' immersion at 70° C. These points both fall very close to the curve shown. The curve for the sample of GR-S-65 tested falls slightly below the average 20-hour value of 2.1 mg sq.cm. for GR-S-65 production at Institute as given in the Office of Rubber Reserve bulletin "GR-S-65," dated January, 1947.

When X-361 was compounded and vulcanized in a gum stock recipe, the water absorption was lowered somewhat. This condition was particularly noticeable after long times of immersion in water, as is shown in Table 6.

Electrical Properties

Because of its very low moisture absorption, X-361 exhibits good retention of dielectric characteristics after long periods of immersion in water. The dielectric constants of lightly cured gum stocks after various times of soaking in water at 70° C. are shown in Table 7. Prior to soaking, the samples had been conditioned for one week at 35° C. in a drying oven containing $CaCl_2$. Measurements were made on a capacitance bridge at 1000 cycles per second, 100 volts.

TABLE 7. DIELECTRIC CONSTANT AFTER WATER IMMERSION AT 70° C.

	Dielectric Constant		
	X-361	GR-S-65	GR-S
Original	2.62	2.64	2.67
After 24 hours' immersion	2.75	2.75	3.17
1 week's immersion	2.88	2.92	4.04
2 weeks' immersion	2.90	2.97	4.73
4 weeks' immersion	3.03	3.22	6.01

Similar data after soaking in water at 98° C. are shown in Table 8.

Similar data after soaking in water at 98° C. are shown in Table 8.

TABLE 8. DIELECTRIC CONSTANT AFTER WATER IMMERSION AT 98° C.

	Dielectric Constant		
	X-361	GR-S-65	GR-S
Original	2.62	2.64	2.67
After 7 hours' immersion	2.78	2.80	3.26
18 hours' immersion	2.85	2.88	3.82
37 hours' immersion	2.88	3.01	4.13
65 hours' immersion	2.97	3.02	4.70

Summary and Conclusions

GR-S of very low moisture absorption results from the coagulation of highly diluted latex with dilute alum solution. By using fresh coagulant constantly, without recirculation of serum, the amount of water-soluble ingredients occluded in the polymer can be kept at a minimum. GR-S produced by the high dilution alum method is approximately equivalent to deproteinized natural rubber in moisture absorption.

Acknowledgment

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Malayan Rubber Policies—II*

P. T. Bauer

MANY smallholders wasted their planting rights by using these to supply vacant patches on their holdings. Up to 30 trees per acre such supplying was permitted unconditionally under rubber regulation and was not regarded either as new planting or as replanting so that it was purely wasteful to use planting rights for this purpose. This waste was the result of widespread ignorance even among headmen and larger owners of the purpose and use of the share certificates issued in 1939-40. The unfamiliarity with these provisions was in turn an inevitable result of the complex machinery of rubber restriction and of the failure of the authorities to explain the regulations to smallholders in simple language free from technical legal jargon.

To sum up the foregoing paragraphs it is evident that the 5% new planting of 1939-40 was of very little use to those smallholders who needed it most, chiefly because individual new planting rights were so small as to render their use impracticable on the smallholdings, and also because no steps had been taken to explain to smallholders the purpose of these certificates. In all probability the smaller owners did not even extend their acreage by 1%, much less by 5%.

Even the very small amount of new planting that actually took place was of doubtful value to smallholders. As was evident from observation and interrogation, much of this new planting was on unsuitable soil, on silted or exhausted fields with a long previous history of food cultivation, or on eroded land or on steep hillside liable to erosion; no assistance was extended to smallholders to help them to improve the soil. Here again personal observation confirmed what could be inferred from easily accessible Malayan publications. For instance, the 1939 *Annual Report*[1] of the Rubber Research Institute of Malaya is unusually explicit on this matter.

"Unfortunately much of the land alienated for new planting, in districts where the population is high and cultivation intensive, is poor, either being old silted padi 'sawahs,' or other areas where, owing to faulty methods of cultivation in the past, most of the soil has already been washed away . . . (Where virgin land was bought) much of this land is undulating or very hilly and in some instances the slope is so steep that it does not appear practicable to advise the construction of terraces to minimize soil erosion, owing to the excessive amount of excavation in the solid which would be required to make them."

Past, Present, and Future Position of Smallholders

It thus appears that official policy and administrative action over the last 25 years have worked greatly to the disadvantage of the rubber growing smallholder; and that at present a policy is being pursued which threatens his destruction. Quite apart from the equity of these measures, it should be noted that they adversely affect the competitive position of the Malayan rubber industry and thus of the Malayan economy as a whole, since the smallholders are the low-cost producers. This is not the place for a detailed discussion of the relative competitive strength of the estates and the smallholdings, but the general position is fairly clear.

The rubber produced by estates and smallholdings fetches approximately the same price; on estates tapping, weeding, and manufacture are carried out by laborers in receipt of a substantial cash wage, with the estates also incurring appreciable costs to provide for the housing and medical care of the estate laborer and for some kind of education for his children; above the laborer there stands the *mandor* (Indian foreman), over the foreman the conductor, who is supervised by the assistant manager, who in turn has a manager above him; on European-owned estates the further steps in the hierarchy include visiting agents, engineers and accountants, the agency house, the secretarial firm, the board of directors, and the shareholders. On smallholdings the identical commodity is produced by the owner and his family, assisted perhaps by a few share tappers or contract tappers (workers paid by results) possibly under a Chinese *kepala* (foreman). It is fairly clear which class produces with greater economy of resources and thus more efficiently. There are, of course, estates which could survive even under competitive conditions of free production and planting by all, but this does not affect the broad picture of the competitive strength of the two classes of producers.

Social and Political Issues Involved

The attitude of the authorities toward the rubber growing smallholder also raises certain broad social and political issues. This point will be appreciated if the social implications of rubber planting by smallholders are considered.

A familiar dilemma often confronts colonial administrators: the choice between efficient, but alien methods of production, supported by outside capital, and local, but primitive and inefficient, effort. In plantation rubber this dilemma does not arise. The smallholders in Malaya have held their own against the estates (except for the effects of the planting provisions of rubber restriction); while in Netherlands India they have made striking progress. Without the two restriction schemes, supplemented in Malaya by severe restriction on the alienation of land for rubber planting, the smallholders would have gained substantial ground at the expense of the estates. Had high-yielding material been made available to the smallholders, their progress would have been very rapid.

Rubber is a crop ideally suited to the needs of Asiatic smallholders. The technique of production is very simple, and there are no great economies of large-scale operation (except possibly from mechanical clearing of large areas); if such economies were substantial, the smallholder could not have competed so effectively. The product is highly standardized, easily marketable, and buying competition is generally keen, much more so than for other crops of the Asiatic smallholder. Rubber is also non-seasonal; thus there is absent the major reason for peasant indebtedness, the need to tide over the cultivator and his family till the harvest is brought in. Moreover, rubber cultivation requires no draught animals, ploughs, or manures, which are so many causes of the notorious indebtedness of the Asiatic peasant. It is thus easy to understand why the smallholder is so attached to rubber growing.

The success of the small grower also raises wider

* Reprinted from *Economica* May, 1947, pp. 81-107, and concluded from INDIA RUBBER WORLD, Aug., 1947, p. 629.

[1] P. 250.

issues. Here is an industry where, statutory restriction practices apart, the small man was able until recently to start on his own and to make a decent as well as an independent living with the possibility of rising to higher levels. This feature of rubber cultivation was frequently emphasized to the present writer in Malaya, generally by Chinese, but also by Indians and even by Malays. Had it not been for the statutory restriction policies prevailing in Malaya almost without interruption since 1922, the number of small and medium owners would today be considerably larger than it actually is.

One need not be an agricultural sentimentalist to believe strongly that such an extension of small individual ownership would have conduced to the social stability of the country. Such considerations can hardly be adduced in favor of organizations based on a large alien labor force without any stake in the country, and often with only very slender sentimental attachment to Malaya. But for the sustained protection, and indeed preference, granted to the estates there would have been many fewer Indian and Chinese estate laborers in Malay in 1941, and many more Malay, Indian, and Chinese owners of smallholdings; the assimilation of Indian and Chinese smallholders would have been much easier than that of estate laborers. This development would also have served to reduce the great political power wielded by a handful of large firms, which some at least of the administrators outside Kuala Lumpur view with considerable dismay.

There is a further important consideration in favor of smallholders' production. Methods have been frequently sought for retaining a larger share of the value of the produce of the colonies in these territories, as a means for improving the standard of living of the colonial peoples. Rubber production by smallholders meets the case very well; production is highly efficient, and the proceeds are wholly retained in the country.

The sustained closure of such an important avenue as rubber planting is also bound to have a substantially adverse effect on the industry, energy, and resource of the people, especially in western Malaya, where opportunities for profitable and suitable investment on the part of the rural population are very limited. In particular, it is likely to dampen any tendency of the people to improve their economic position. The importance of this last consideration has been stressed by Professor Raymond Firth in a somewhat different context with reference to the Malay peasantry of Kalantan and Trengganu:

"I observed no case in which a good catch one day caused the crew to lay off their net—the result was to increase their keenness to get more, not to diminish it. Among the reasons for this are the range of opportunities for expenditure on consumer goods in the local shops and the avenues for local investment of cash in land, boats and nets."[12]

There is also the spread of extremist political movements to be considered. It would be foolish on the basis of a few weeks' visit to dogmatize on the strength of these movements whose offices can now be found in quite small villages. Many of these appear to be mushroom growth and are indeed of the nature of a stage army. But in some parts of the country, notably in certain areas of Johore and of Perak, they seem to have obtained a foothold, and it is doubtful whether it can be stated with absolute confidence that they will be reduced to insignificance as soon as the shortage of rice and cloth is removed. But whatever view is taken on the actual and prospective strength of the various extremist elements, their power for mischief would be substantially diminished by a reduction in the number of landless agricultural workers, and by an expansion in the number of owners of rubber smallholdings. Such development would decrease the number of people susceptible to such propaganda and increase the number and influence of those likely to resist it actively. There is a section within the communist movement in Malaya whose members are communist in name only and whose main aim is to own some land; these people are kept in the ranks of the communists by the opposition of the authorities to an extension of the smallholdings area.

[12] "Malay Fishermen: Their Peasant Economy," (p. 96).

Malayan Rubber Research Institute

Centrally organized technical research is of considerable importance in the plantation rubber industry for two different reasons. The first is the comparatively small size of the individual unit of control. In Malaya there is no producer with as much as 3% of the planted area of that territory; there are only four or five estate producers with more than 1% of the planted area; the overwhelming bulk of the acreage is in the hands of producers with only a small fraction of 1% of the Malayan acreage under rubber. Secondly, the plantation rubber industry is still in its technical infancy. Almost the entire industry is still in its first short period in the Marshallian sense, in that the physical capital first invested has not yet been renewed. Moreover the great bulk of the planted area has spent almost the whole of its mature life under restriction. Technical progress in the industry has at times, been very rapid, but the combination of the short history of the industry, the longevity of the trees, and the long spells of restriction on output and planting has brought it about that some elementary points of planting technique are still undecided. Since the late 1920's or early 1930's the importance of plantation research has been widely recognized, as also have the possible benefits accruing to different classes of producers from the fruits of competently conducted research. In fact, the assistance derived from the research organizations might, in the long run, be an important factor in the physical productivity and the competitive strength of the various sections of the industry.

In Malaya, plantation research has since 1925 centered in the activities of the Rubber Research Institute of Malaya, which is a statutory body financed by compulsory levies on all producers. Before 1941 the Institute was financed from the proceeds of a specific export tax on all Malayan rubber export. At present its revenue is derived from general taxation, of which the present heavy export tax on rubber is a major item. The Institute thus appears at first sight to be an organization belonging to, and working for the Malayan rubber industry. But its designation is a misnomer, and in its activities it is not a Rubber Research Institute of Malaya, but only an Estate Rubber Research Institute. It is proposed to show in this section that only a very small part of the work of the Institute has been concerned with smallholdings; that the officers of the Institute are unfamiliar with smallholders' rubber; and lastly, that the Institute has actually impaired the interests of this class of producer.

As a source of revenue, the smallholders have always been a major support of the activities of the Institute. Until the introduction of rubber restriction some 45-50% of the Institute's revenue came from smallholdings. The advent of restriction reduced the share of the smallholders in the total Malayan output (chiefly through underassessment; in two years the smallholders were also sellers of export rights to estates), and thus their relative contributions to the revenue of the Institute, which between 1934 and 1940 ranged from 32 to 40%. Over the decade of the Thirties the proportion was about 40%; in the absence of restriction or with more equitable

assessments, the proportion would have been close on one-half. Moreover, for the purposes of the Smallholders' Advisory Service, discussed below, the Institute used to class as smallholding all Asiatic estates under 500 acres, and occasionally even all Chinese estates. On this basis more than one-half of its revenue was derived from the producers covered by the Smallholders' Advisory Service. At present the bulk of Malayan rubber exports come from smallholdings, and a correspondingly large proportion of the export tax is also contributed by this class of producer.

In 1933 the affairs of the Institute were investigated by a small commission presided over by Professor (now Sir Frank) Engledow. After a critical review of existing arrangements, in the course of which it was stated that no advice was available to the smallholders, the Commission recommended the establishment of a Smallholders' Advisory Service within the Institute. This was set up in 1934. But until 1941, only a very minor part of the activities of the Institute was directed toward assisting smallholders. The 1934 *Annual Report* of the Institute barely referred to the smallholders; the 1935 *Report* devoted four out of 160 pages to the smallholders, and by 1939 this figure had risen to 21 out of 277 pages. Summaries of the budget of the Institute were regularly published in the *Annual Reports*, and from these it appears that in 1934, 2%, in 1935, 5%, and in 1939 about 10% of the total expenditure was spent on this service, which, it will be remembered, covered not only smallholdings but in practice all Asiatic-owned properties. Until 1937 no European officer was assigned to the Advisory Service. In that year the personal assistant of the Director supervised the service on a part-time basis. In 1938 one full-time European officer (out of 21) was entrusted with this work. This officer was one of the most junior (possibly the most junior) of the European officers of the Institute.

The obvious *prima facie* objection might be advanced that the general work of the Institute benefited the smallholders, as well as estates, and that this vitiates such comparisons as those of the preceding paragraph. This objection is not valid. A large part of the time of the officers of the Institute has always been devoted to advisory work for estates, in the form of visits to estates, analysis of soil and plant samples sent by estates, correspondence with estates, lectures to planters' associations, and showing planters around the experimental station of the Institute. The analysis of the work of each division used to be given in detail in the *Annual Reports* of the Institute, including the proportion of his time devoted by each qualified officer to advisory and to research work; advisory work was generally more than one-third of the total. To take a random example: according to the 1937 *Annual Report*,[13] officers of the soils division of the Institute visited estates on 262 occasions during 1937, and of these visits only 113 were in connection with research work. It is well known in Malaya that many visits of the officers of the Institute have always been concerned merely with routine advisory work devoid of any research interest. Moreover most of the research work was not fundamental, but applied or economic research, on such matters as manuring, disease control, replanting and tapping systems, and most of these were of interest to estates only. Lastly, all experiments were carried out on the basis of estate technique, and most of the results were of little or no value to smallholders. The objection thus falls to the ground, and the comparisons given in the last paragraph are relevant.

[13] P. 72.

It has been argued to the writer by an officer of the Institute that experiments must of necessity be carried out on estates, as no proper control is possible on smallholdings, and that this accounts for the preponderant or rather exclusive interest of the Institute in estates. This does not explain why the advisory work of the European officers has been confined to estates, nor why the research work has been concentrated on problems of interest to estates. Moreover some experimental work could almost certainly be carried out on smallholdings. At least yield records could be collected from smallholdings on the performance of seeding rubber and of some of the better-known types of budwood. Such records would almost certainly yield material of interest.

More remarkable than the somewhat one-sided nature of the activities of the Institute is the unfamiliarity of the officers with the conditions and problems of smallholdings. Here it is possible to quote published and easily accessible material. Lest it be thought that isolated or unrepresentative instances have been chosen, a number of examples will be quoted at some length.

In April, 1935, the then head of the chemical division of the Institute, who was one of its most senior officers, addressed the Rubber Division of the American Chemical Society on the preparation of Malayan rubber; his views were widely reported in the trade press. This is how this officer described to their main customers the produce of the Malayan smallholders:

"The rubber from very small holdings is no better prepared than it was six years ago. It contains, as it always did, dead spiders, leaves, sand, dirt and betelnut juice and is manufactured in a haphazard fashion. Most of it is bought in the United States in the form of Singapore blanket which finds a ready sale."[14]

Actually it is Netherlands India native rubber that is sold as Singapore blanket; as is common knowledge in the industry, Malayan smallholders' rubber has always been marketed in sheet form; on the Singapore market it is sold as Chinese smoked sheet. Chinese smoked sheet Nos. 2-4, which are the most representative grades of Malayan smallholders' rubber and which comprise the great bulk of the output from Malayan smallholdings, are generally quoted at prices which are only between 3% and 5% lower than those of first-quality estate ribbed smoked sheet. With the exception of a small quantity of very-low-grade rubber produced chiefly in the remote areas of Kelantan and Trengganu, the great bulk of Malayan smallholders' rubber was throughout the 1930's sold in Singapore at only 3% to 6% below good estate rubber, which is sufficient to refute the statement just quoted. These facts and figures can be verified from easily accessible sources, such as the *Malayan Agricultural Journal*, where the percentage of smallholders' rubber sold as smoked and unsmoked sheet respectively used to be stated regularly for all the principal producing areas. The market prices of smallholders' and estate rubber in Singapore were also quoted, and the fine margin between these grades was clearly shown. Through the courtesy of the United Baltic Corp. the writer was given access to the records of their transactions on the Singapore market in the early 1930's; the prices paid by that firm for Chinese smoked sheet Nos. 2-4 were generally between 3% and 5% below first-quality estate rubber. It remains to be added that the chemical division of the Institute was responsible for research into, and advice on, the preparation of Malayan rubber. According to the 1938 *Annual Report* of the Institute, the officer just quoted adjudicated prizes at the Malayan smallholders' rubber competition of that year.

Another remarkable opinion by the same officer can be found in a paper "Brown Bast: Some Considerations

[14] *Bulletin* of the Rubber Growers' Association, Sept., 1935.

as to Its Nature";[15] the paper deals with the incidence of this bark disease: "The average smallholding contains infinitely more permanently dry trees than the average estate . . . the smallholding presents fewer brown bast cases because it has so few even reasonably vigorous trees".

This statement seems to suggest that there was so little disease on smallholdings because most of the trees were already dead. In fact the yield per mature acre on smallholdings at that time exceeded estate yields by 25%. It would be interesting to know the basis of that article. Official inquiries carried out two or three years after its publication found only eight dead out of 9,000 trees examined in the course of the investigation.

The views of the Rubber Research Institute on the tapping methods of smallholders are also of interest. Over-tapping and excessive bark consumption always found a place among the few paragraphs devoted to smallholders in the *Annual Reports*. No evidence was ever put forward to support these statements, which were in marked contrast to the findings of an official inquiry into the bark consumption of Malayan smallholdings conducted under the auspices of the Department of Agriculture in 1931-33, when production was not restricted. It was found that bark consumption on the holdings investigated was a small fraction of the usual estimates; that bark consumption was not in excess of the rate of bark renewal, and that bark reserves were ample.

Over-tapping and excessive bark consumption are referred to in the 1936 and 1937 *Annual Reports* of the Institute coupled paradoxically with references to rural unemployment caused by sales of coupons.

According to the 1938 *Report*,[16] "The average smallholder still cares little for the rate at which his bark is being consumed which may be as high as three or four inches per month, and is quite unmoved by warnings as to what may happen if he continues to tap as wastefully as at present."

This last statement would certainly have needed some supporting evidence. In 1938 the rates of release under rubber restriction averaged 55% only (the lowest during the restriction period), and the smallholders were moreover under-assessed. Their output totaled some 115,000 tons in that year, against 175,000-200,000 tons during the official 1931-33 smallholdings inquiry which found *annual* bark consumption to average 4.92 inches on full circumference; the 1938 production equalled about 200 pounds per mature acre, as against 385-465 pounds over the period covered by the smallholdings inquiry.

The 1939 Annual Report observed:[17] "Many tapping panels on small holdings would, on estate standards, probably be considered untappable."

This might have been so, but was irrelevant, as the economics of estate and smallholders' production are different, and a tree untappable by estate standards may be tappable by a smallholder without cash wage costs. The remark confirms the suspicion that the acquaintance of the Institute with the economics of production on smallholdings was inadequate.

By its very nature the statement that the work of the Institute actually impaired the position of the smallholders cannot be proved formally; but there is enough evidence furnished by action and inaction of the Institute to support it. There was the regular annual toll in the form of the specific export tax, whose proceeds were devoted to advisory and research work on behalf of the estates, thus strengthening the competitive position of the latter against the former. More important than the actual taxation of the smallholders for the benefit of the estates was the suggestion inherent in the name, constitution and financing of the Institute that a responsible body was actually looking after the interests of the smallholders, when nothing was in fact done. The development of high-yielding material benefited only the competitors of the smallholders so that even fundamental research was of little benefit to them; applied research and advisory work were carried out almost solely for estates. While the Institute liberally assisted the estates in their replanting program, attention was not drawn to the potentially disastrous results for smallholders of the planting provisions and of the extensive replanting activity of estates. More important still, the statements in the *Annual Reports* of the Institute in the alleged excessive bark consumption on smallholdings served to give credence to views on this subject which gave spurious justification to the under-assessment of smallholdings. Opinions such as those expressed by officers of the Institute and quoted in the paragraphs above, naturally also served to discredit the smallholders and their produce and to lend spurious justification to their severe under-assessment. The most important item under this heading was, however, the failure of the Institute to make available to smallholders (who, it will be remembered, contributed almost half of its revenue) high-yielding planting material. This matter deserves some attention.

The bulk of the small area newly planted or replanted on smallholdings in the course of the last 10 or 12 years was planted with unselected seedling material. It is not easy to explain the failure of the Rubber Research Institute of Malaya to provide high-yielding material for the use of the smallholders from whom some two-fifths of its revenue was derived. In the 1939 *Annual Report* of the Institute a few paragraphs[18] are devoted to this matter; when stripped of the verbiage it becomes clear that nothing was in fact done. One passage is of special interest:

"Unfortunately distribution of some of the most valuable clones[19] is restricted owing to the fact that they are owned by private companies who will sell only on the completion of a legal agreement that material will not be multiplied for resale. As a result, these clones are not, in general, available to smallholders."

This is most misleading. First, the passage does not explain why clonal seed[20] was not made available to smallholders, or why the Institute's own clones were not used for the purpose. But the statement is open to a graver objection. Much the most popular clone, both for new planting and replanting in Malaya, was the celebrated Tj. 1 (Tjirandi 1), while Tj. 16 was also among the six leading clones. Tj. 1 is particularly suitable for planting on smallholdings. It is an excellent all-round clone, and its only defect is a slight liability to windbreak. On the densely planted smallholdings this risk is much diminished. All Tj. clones are free and can be multipilied for re-sale. The use of these clones has been advised by the Institute on several hundred occasions and possibly over a thousand occasions; the clones were also used on a large scale on the Institute's own experiments. Those responsible for the *Annual Report*, the most important publication of the Institute, must have known that the Tjirandji clones were free. Accordingly, the passage quoted seems very unsatisfactory, and indeed is not without grave implications.

(*Continued on page 791*)

[15] J. *Rubber Research Inst. Malaya*, II (1930).
[16] P. 197.
[17] P. 247.
[18] P. 253.
[19] A clone is the vegetatively propagated offspring of one mother-tree; all such vegetatively propagated offspring of a given mother-tree are of identical genetical constitution.
[20] Clonal seed is the genetically (sexually) propagated offspring of various clones.

Processing of Channel Blacks in a GR-S Tread Stock[1]

Gardner L. Brown[2]

IN 1945 a severe channel black shortage occurred which made it necessary to blend some of the various types of channel blacks. This blending had to be done to avoid production bottlenecks caused by shortages on any one particular type of black. Since shipments were on a "hand to mouth" basis, it was impossible to anticipate potential processing difficulties.

In view of this situation it became desirable to know just what might be expected to happen, say, if a medium processing channel black had to be substituted for an easy processing black. Four blacks were chosen which met the common requirements for:

Easy processing channel black
Medium processing channel black
Hard processing channel black
Conductive channel black

A 45-part EPC, GR-S tread stock was selected as the medium for trial since this stock had the least compound and mixing variables to control. A standard lot of Goodyear Archwood Polymer Plant, batchwise GR-S was used as the polymer, and to insure uniformity in all tests it was blended from three skids at the Banbury before mixing.

The major part of this test program was carried out in factory equipment. For each type of black, three #11 Banbury batches were mixed and then tubed in a single-head tread tuber. Banbury power requirements, peak power loads, mixing temperatures, and handling qualities were noted. At the tuber, breakdown, extrusion temperature, tread roughness, and edge breaks were specifically observed. To check factory results further testing was made on laboratory mixed stocks.

Experimental Details

Briefly, the factory mixing procedure was as follows: First a black non-productive stock was made which contained all of the GR-S, black, and oil. The non-productive stock was remilled (Banbury) until it was of the desired plasticity (usually three times). In the next step accelerators and curing agents were added. All mixing was performed in a 30 r.p.m. #11 Banbury equipped with a power meter. A 24-hour aging period was allowed between each mixing stage.

Table 1 shows the total power requirement to produce one batch of finished stock by means of the above-mentioned mixing method. A definite trend can be noted in that CC, HPC, and MPC blacks create greater Banbury loads than does the EPC black. Considered on a small scale, this point would not be important, but on a large-volume mixing schedule it becomes a definite factor in Banbury life, power costs, etc. Two values are listed for conductive channel black because of variable mixing time caused by unpelletized black.

TABLE 1. MIXING POWER

KWH to Make One Finished Batch

EPC	66.75
MPC	67.58
HPC	68.26
CC	69.26 to 74.26

Peak power loads were recorded, but no definite trends were observed. Apparently the peak load is not a function of black type.

A trend was noted in that lower mixing temperatures (other conditions being equal) are produced by the EPC black, and higher by the conductive channel black. Table 2 demonstrates this and shows that for any of the mixing stages, the differences are of 10 to 15° F. which, although not critical for most conditions, add to the evidence indicating more difficult processing when channel blacks other than EPC are used.

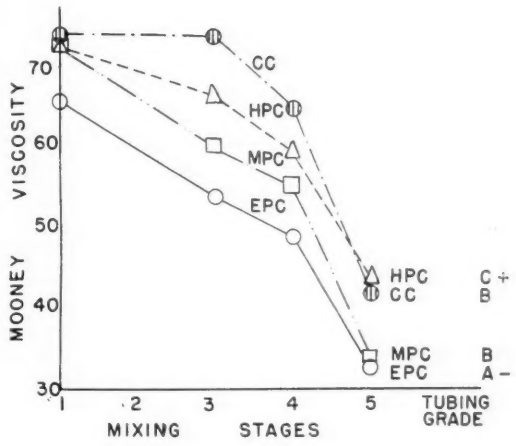


Fig. 1. Mooney Viscosity vs. Processing

TABLE 2. BANBURY DISCHARGE TEMPERATURES

Various Channel Blacks in a GR-S Tread Stock

T = °F.

	EPC	MPC	HPC	CC
Black non-productive	320	313	323	337
First remill	234	229	239	250
Second remill	...	...	...	...
Third remill	240	249	256	257
Productive	217	224	225	228

TABLE 3. EFFECT OF CHANNEL BLACK TYPE ON FACTORY TUBING OF A GR-S TREAD

All Stocks Had an Equal Amount of Mixing

Black	Appearance	Probe Temp. (°F.)	Grade
EPC	Fair +	257	A—
MPC	Fair—	260	B
HPC	Rough +	262	C+
CC	Fair—	...	B

Breakdown and edges of all stocks OK.
Used eight-inch single screw Rapido tuber.

Figure 1 shows the effect of different channel blacks on the Mooney viscosity of stock from each remill. Regrettably, no tests were obtained on the first remill stage, but for the other steps it can be seen that CC, HPC, MPC, EPC blacks, run in that order of toughness. This difference can be very serious if factory operations depend on a Mooney viscosity control to decide when a stock has had sufficient remilling.

Table 3 shows the results of the first factory tubing run. For this comparison each stock tubed had previously been given an equal amount of processing. It will be seen that in changing from EPC black in the

[1] Presented before the Division of Rubber Chemistry, A. C. S., Cleveland, O., May 26, 1947.
[2] Goodyear Tire & Rubber Co., Akron, O.

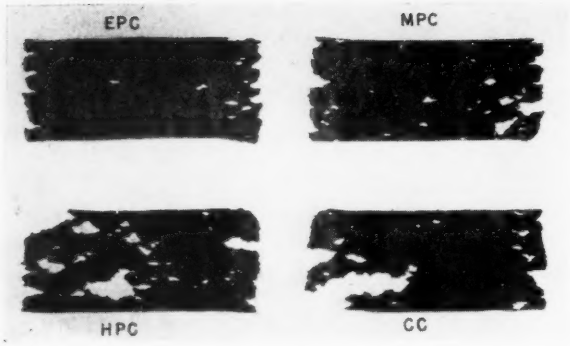


Fig. 2. Mill Nerve—Factory Mixed

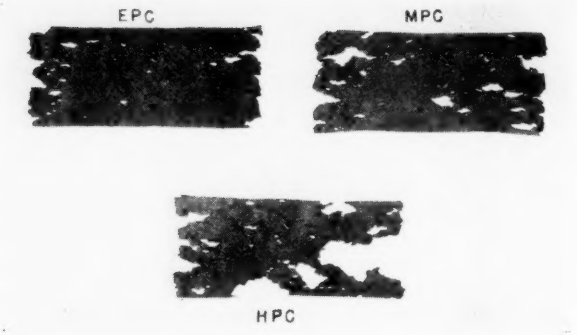


Fig. 3. Mill Nerve—Lab Mixed Stock

direction of HPC, hotter extruding, tougher, drier, and rougher treads are produced. The tubing grade assigned to each stock offers a reference between the various results: A is considered the best. CC black tubed better than HPC, being equal to MPC. Although all of the treads produced were of acceptable smoothness for tire building, such would not have been the case had a thinner, wider tread been used in these trials.

Before the second factory tubing run was made, the two tougher stocks (HPC and CC) were given two extra remills in order to make all stocks of approximately the same softness. Enough EPC and MPC black stock was left over from the first run to incorporate these as controls for the second factory tubing run. The EPC and MPC black stocks tubed alike; the HPC black stock and nearly equal to the EPC black stock, and the CC black stock was a little poorer than the HPC black stock, although extrusion temperatures still showed the HPC black stock to be 7° F. higher than EPC black stocks. (See Table 4.)

Table 4. Effect of Channel Black Type on Factory Tubing of a GR-S Tread Stock

Amount of Processing Varied to Obtain Comparable Finished Stock Plasticities

Black	No. of Remills on Non-Prod. Stock	Appearance	Probe Temp. °F.	Grade
EPC	3	Smooth	256	A
MPC	3	Smooth	...	A
HPC	5	Fair —	263	A—
CC	5	Fair	265	B+

Breakdown and edges of all stocks OK.
Used eight-inch single screw Rapido tuber.

In short, it took two remills (33% increase in the overall mixing time) to make EPC black and HPC black stocks equal on a tubing basis. In trying to maintain an efficient mixing schedule, such a condition is serious.

Another means of demonstrating the difference between these blacks can be found in the "Mill Cohesion Test." For this, a volume of rubber is milled under controlled conditions on a lab mill. After a definite interval of time, the mill is stopped, and the stock allowed to shrink while on the mill. After another interval the stock is cut off, and the holes torn by shrinking are compared with graded standards. Figure 2 shows a photograph of the samples as cut from the mill. The sharp trend from the EPC to HPC black stocks can be seen, showing that the latter is definitely a poorer material to handle. Figure 3 shows this even more clearly. This test was performed with laboratory mixed stock.

Summary and Conclusions

In review, it was found that EPC black favors lower mixing temperatures, total power loads, and lower Mooney viscosities. Factory-scale tubing tests showed that EPC and MPC blacks tubed nearly alike, EPC having the edge by a 3° F. lower extrusion temperature, and producing a slightly smoother tread.

HPC black has an extrusion temperature five degrees higher than EPC and gives a usable but rougher tread. It took two remills to bring the HPC black stock to a smoothness nearly equal to that of EPC.

CC black, although giving a stock with higher Mooney value than EPC, tubes nearly as smooth.

Mill cohesion tests show definitely that EPC is the best of the channel blacks from a processing standpoint.

The overall picture shows additive processing detriments of the use of channel blacks other than EPC.

The author wishes to thank Paul Beebe and J. H. Fielding for consultation and valued advice, and F. J. Dugan, Goodyear Tire & Rubber Co., for permission to make public this information.

Developments and Improvements

(*Continued from page 780*)

Each day each operater was required to test at least one sample of the reference lot along with the samples from production. From the values obtained for the reference lot during the course of the month it was possible to detect excessively erratic results and to take the necessary steps to eliminate the cause. A comparison of tests of the reference lots by 16 GR-S plants showed that the standard deviations for stress at 300% elongation decreased from about 75 p.s.i. in the middle of 1944 to 30 p.s.i. at the beginning of 1947—a reduction of 60%. The dispersion of the test results during 1943 was even larger than those given here for 1944. The dispersion of test results within a plant was about one-third less than these figures, but the percentage of improvement over this same period of time was of the same order of magnitude.

Summary and Conclusions

In conclusion, improvements in test methods and standardization of procedures for the past four years have contributed toward better control of production. As a result, synthetic rubber is now produced with a uniformity never attained with natural rubber. A recently developed test procedure involving the measurement of elongation at constant stress offers the possibility for further improvement.

Some Studies on the Concentration of German Buna and GR-S Latices

Samuel H. Maron[1] and Carl Moore[1]

TECHNICAL reports emanating from Germany in 1945 mentioned that the Germans had developed a novel process for the concentration of Buna latices frequently referred to as the "*Stockpunkt*" method. The Germans cooled a latex to its gel point, or "*Stockpunkt,*" and at the same time beat it into a foam by vigorous agitation. The latex, after remaining in this condition at lowered temperature, separated into serum and a curd-like material which on warming yielded a fluid latex of considerably higher solids than the original. In this manner the Germans were able to obtain latices of 42-50% solids from latices having originally only 25-30% solids.

GR-S latices subjected to the same procedure do not exhibit this gelling phenomenon[2] and cannot be concentrated by analogous means without pretreatment. The reason for this difference in behavior between GR-S and Buna latices became obvious when two samples of German latex were sent to this laboratory for study. Analyses of these latices showed them to contain relatively high concentrations of electrolytes, mostly sodium sulfate, which impart to them this phenomenon of gelation. On the other hand GR-S latices, which do not contain electrolyte in anywhere near the quantity found in the German latices, do not exhibit this characteristic.

In this paper are described some observations made on this process in our laboratory, as well as some modifications introduced during the course of the investigation. Also mentioned are some preliminary studies on the application of this process to GR-S latices, which led eventually to the development of a new method for latex concentration. The latter will be described in subsequent publications.

The German Concentration Process

According to available information, the German method of concentrating latex involves in essence the following procedure. The latex to be concentrated is beaten into a foam with special agitators and at the same time cooled below its "*Stockpunkt*" or thickening point. During the latter operation 0.2 to 0.5% sodium carbonate, based on the weight of latex taken, is added to raise the gel point. Following the formation of the initial foam, which increases the original volume about fivefold, stirring is continued until the batch has cooled to the desired temperature. Agitation is then continued until the foam begins to granulate, and finally the cooled mass is allowed to stand undisturbed for four to five hours. During the latter stage the mass separates into a more or less clear lower layer of serum and an upper layer of curd-like latex. The serum is subsequently drained off, and the curd-like mass is warmed up to yield a fluid latex of 42-50% solids.

Besides sodium carbonate addition agents such as soap or Latekoll (ammonium or sodium polyacrylate) were used to adjust the thickening point of the various latices to be concentrated. In general the Germans aimed for a gel point of 12 to 14° C since they considered such a temperature to be optimum for the process. According to the Germans the serum from the above process is supposed to contain about 75-80% of the Nekal originally added, 50-60% of the inorganic salts, and 18-20% of the linoleic acid present in the latex taken for concentration.

Concentration of German Latex by the "*Stockpunkt*" Method

A study of the German concentration process was made first on a sample of latex of German origin supplied us by the Government Evaluation Laboratory in Akron. This latex had a total solids content of 42% and contained 1.7 parts of sodium sulfate per 100 parts of polymer. The source of electrolyte in the latex was traced to the Nekal charge. In the preparation of the Nekal, a sulfonated naphthalene product, the inorganic sulfate formed was not removed after sulfonation of the organic material and consequently was introduced into the latex when the Nekal was charged to the reactors. The latex in question contained enough of this electrolyte to cause it to gel at 16° C. when cooled.

The procedure outlined above was applied to a sample of the latex without previous addition of sodium carbonate. When the latex was stirred rapidly and cooled until it gelled, it became very viscous and foamed up considerably. On continued agitation for 15 minutes at 13° C. no further observable change could be detected in the mass, but when the temperature was lowered several degrees and the agitation continued for eight more minutes, the latex mass broke and agglomerated into small granules. Still, on allowing this granulated mass to stand for one hour at the lowered temperature, no separation of serum took place. However, when the mass was left undisturbed overnight in an ice bath, a cloudy serum separated, and the curd-like material which constituted the upper layer yielded on warming to room temperature a fluid latex of 48.6% solids. In this manner a concentration of the latex from 42.0 to 48.6% solids was achieved.

The above procedure was repeated next on a sample of the latex which had been diluted with water from its original 42% to 27.4% total solids. This sample, on being chilled at 8° C. and stirred for 30 minutes, gave no granulation. A small quantity of sodium carbonate was then added, and stirring continued at 5-6° C. for 15 minutes, at which time granulation became evident. The sample was then placed in an ice bath, and within 45 minutes about 20% of the water in the sample separated out as a slightly cloudy serum. Overnight this volume of serum about doubled, and the curd-like material in the upper layer, after being warmed to room temperature, was found to contain 42% solids. Thus in the experiment described the original 42% solids latex was diluted, the diluent removed, and the latex restored to its original concentration by this technique. The serum was found to contain some of the Nekal, sodium sulfate, and soap present in the original sample, as well as some of the sodium carbonate added.

[1] Case Institute of Technology, Cleveland, O.

[2] The term gelation is used to describe the thickening of a latex to a point where the latex is transformed to a coherent mass. The term is used without prejudice as to whether the phenomenon is reversible or not.

Concentration of German Latex by Centrifuging

To ascertain whether centrifuging could be utilized instead of sedimentation under gravity in the concentration process, a sample of the latex was concentrated with the following modifications. Fifty milliliters of the latex were diluted with water to 28% solids, and 0.22 gram of sodium carbonate was added. This sample was chilled and stirred for 40 minutes. It thickened between 15 and 11° C. and, as a result of the agitation, it was whipped up to a volume about three times the original. Upon one hour's standing at 3° C. about 15% of the water in the sample separated as a clear, yellow serum. Separation and centrifuging of the upper layer, while it was still cold, caused the foam to break and led to further separation of serum. After a few minutes' centrifuging, the solids in the final concentrate was raised to 40.8%; while the serum was found to contain 2.4% of water soluble solids.

This experiment definitely showed that centrifuging is a satisfactory method for separating serum from rubber in a gelled latex, and it also tended to indicate that in all probability the granulation and foam formation during the chilling and agitation may not be necessary adjuncts of the process. Consequently a concentration was attempted without stirring or beating the latex into a foam. The original latex without any addends was gelled at a low temperature, and the entire mass centrifuged for a short time while still cold. This procedure proved successful and gave total solids ranging from 42 to 46%. It also showed that the concentration of the latex could be accomplished by procedures other than those used by the Germans, and that granulation and foam formation were not necessary for the concentration process. Concentrates obtained by centrifuging redispersed on warming just as well as samples prepared according to the method employed by the Germans. In every case the latices showed opalescence and good fluidity and in general appeared to have suffered no damage from the chilling, gelling, and centrifuging.

Portions of the German latex, when cooled and gelled without agitation, foaming, or granulation, showed only very slight tendency to separate serum on standing. Longer holding periods in the gelled state, up to 15 hours at 0° C. showed no marked increase in serum separation. These observations again confirmed the fact that serum separation can be accomplished without agitation or pretreatment of the latex, but in such cases centrifuging rather than natural sedimentation may be required to separate rubber from serum.

Effect of Electrolyte on Gelation of German Latex

In testing the stability of the German latex to electrolyte addition it was found that only a small amount of sodium carbonate could be added without causing gelation or the formation of a creamy dispersion. At 25° C. addition of sodium chloride up to 0.087 N in the latex was sufficient to cause thickening to occur. This gelling of the latex is readily correlated with the "*Stockpunkt*" phenomenon the Germans utilized in their concentration process. It is entirely reversible, just as is the gelling phenomenon. The warmed and redispersed gel gives no indication that the latex has suffered in any way in the gelling process. Opalescence as well as fluidity are recovered, and cooling again of the latex salt mixture causes the thickening to return in the same way as it takes place in the unadulterated latex.

A sample of the German latex with the gel point raised to 25° C. by sodium chloride addition was subjected to the German concentration process at a temperature of 20° C., and it behaved exactly as did samples of the original latex without added electrolyte when processed at a few degrees below their gel point of 16° C. Granulation readily took place, and on long standing or centrifuging a yellow serum appeared. Further, the concentrated mass redispersed very readily and regained the original physical appearance of the latex on warming, and it exhibited a reversible gel point of its own near room temperature.

The behavior of the German latex on cooling is not surprising when account is taken of the electrolyte already present in the latex. It has been found in this laboratory[3] that at a given solids content less electrolyte is required to produce flocculation of rubber in GR-S latices at lower than at higher temperatures. Since the German latex already contained sodium sulfate, cooling to lower temperatures was sufficient to produce the gelling or thickening phenomenon described. The absence of gelation in GR-S latices is accountable, therefore, by the fact that the electrolyte content of these latices is very low compared to that present in German latices. In essence, the entire German concentration procedure may be described as a temporary aggregation process wherein the amount of electrolyte used is not large enough to produce total agglomeration of the latex, but it is sufficient to give serum removal without complete destruction of the colloid system.

Effect of Dilution on Gelation of German Latex

In studying the effect of electrolytes in flocculation of GR-S latices it was observed[3] that the amount of electrolyte required to cause separation of rubber from serum depends upon the total solids content and increases as the concentration of the latex is decreased. In view of the similarities between gelation in German latices and flocculation of GR-S latices, it may be anticipated that the gel points would be dependent upon the solids content of the latex. This was actually found to be the case. To study the effect of latex concentration upon gelation and serum removal three samples of German latex were taken, one at the original concentration, one 75% of the original, and the last 50% of the original solids. These samples were cooled in an ice bath, and it was observed that gelation occurred in the first two samples; whereas the third sample did not exhibit this phenomenon. However, when a small amount of sodium carbonate was added to the last sample, gelation did occur at a low temperature, and on the sample's standing for several hours in an ice bath, separation of serum was observed.

Centrifuging of the above-mentioned samples, when cold, gave serum segregation in the straight latex, very little in the 75% dilution samples, and none in the 50% sample. However, when sodium carbonate was added to the 50% sample, serum separation did take place during centrifuging.

These experiments demonstrate quite clearly that the phenomenon of gelation is dependent upon the total solids of the latex as well as on the electrolyte concentration. The dependence further appears to be of the same kind as observed previously in this laboratory in connection with the flocculation of GR-S latices,[3] where it was found that flocculation occurred only at a given electrolyte concentration in the latex, and that this connection at a given temperature was the higher the lower the solids content of the latex.

Gelation and Concentration of GR-S Latices

As was stated previously, GR-S latices, owing to their

[3] The work referred to is to be published in the near future. See India Rubber World, Aug., 1947, p. 651.

low electrolyte content, do not exhibit gelation on cooling. However, when electrolyte is added to both Type II[4] and Type III[5] latices, gelation can be made to occur, and in fact the GR-S latices can be subjected to the German concentration process. On addition of electrolyte, and with certain adjustment of latex soap content and pH, these latices can be made to gel and to give serum separation on standing or centrifuging. Removal and warming of the concentrated material yield more or less fluid latices which are very stable in case of Type III latex, but in the case of Type II latices a tendency toward coagulation on standing is observed.

Since these studies were completed, an extended investigation was made of the concentration of synthetic latices by the German technique and various modifications of it. As a result of this work, a process has been evolved by means of which these latices can be manipulated to yield extended serum separation, and removal of the serum is made possible by a very rapid filtration procedure. The concentrates obtained give a much higher rubber content than reported by the Germans and show very promising characteristics and properties. A detailed report on this new concentration procedure is at present in preparation and will be issued soon.

Acknowledgment

This research was sponsored by the Office of Rubber Reserve, Reconstruction Finance Corp., as a part of the Government Synthetic Rubber Program. The results described herein were first reported in July, 1945.

[4] Type II latex is the same as the latex from which standard GR-S is made, except that no antioxidant is present.
[5] Type III latex is prepared from butadiene-styrene charged in 1:1 proportions by weight, and with rosin soap as emulsifier.

Malayan Rubber Policies

(*Continued from page 786*)

The following extract from a leading article in *The Planter* (an influential Malayan monthly), June, 1930, may serve to illustrate the implications of the failure to make high-yielding material available to smallholders, as well as illustrate the motives behind the opposition to new planting by smallholders.

"In the hands of the producers of budwood lies the decision whether rubber planting will, in the far from remote future, become a native industry, or remain an asset of immense value to those European races to whose administrative skill and financial acumen the development of Malaya and of the Dutch East Indies had been due . . . . . it is the honest unbiased opinion of many leading men outside the rubber industry that the less the smallholder has to do with rubber the better will it be in the long run for himself, and for all others engaged in rubber production."

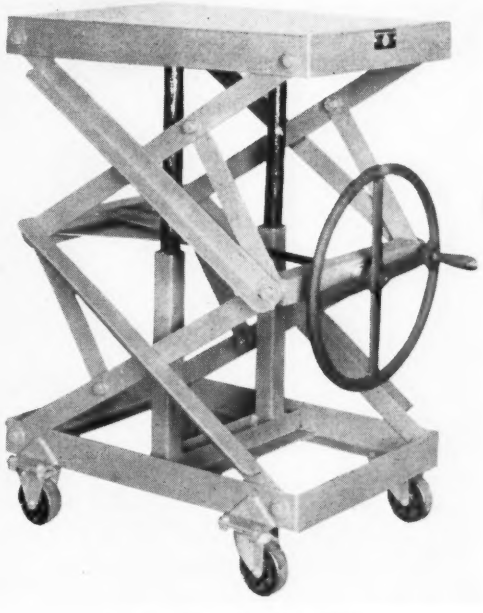
These altruistic sentiments have always been out of place, since the smallholders as well as the estates have always paid the specific export tax from the proceeds of which the Rubber Research Institute of Malaya is financed.[21]

In their scarcely disguised discrimination against the smallholders the activities of the Rubber Research Institute of Malaya appear to be complementary to Malayan rubber policy generally. In present conditions this not only handicaps the smallholders, but also impairs the competitive strength of the Malayan rubber industry and thus of the entire Malayan economy. The policy of this statutory body is explained partly by the one-sided composition of the permanent committee of the board of the Institute. This is the active part of the governing body, and it controls the finances of the Institute. The membership of the permanent committee comprises the director of the Institute, the financial secretary of the government (whose duties and interests lie far away from rubber research), and three representatives of large estates.

[21] The length to which certain circles are prepared to go to maintain the estates against smallholders also emerges from a letter which appeared in the *Financial Times*, and is reproduced in India RUBBER WORLD, September, 1930: "Is it not time the Governments concerned faced the position and prohibited cultivation of rubber by smallholdings? Briefly, my argument is to eliminate the smallholder by legislation and then introduce a generally accepted restriction scheme. Only by this means can the rubber industry be protected and assisted to better times. The alternative is survival of the fittest, who in the long run is sure to be the native smallholder."

Conclusions

It would appear from the foregoing pages that the policies pursued in Malaya, and in particular the maintenance of the planting provisions of rubber regulation, threaten not only to destroy the competitive strength of the Malayan economy and to eliminate the smallholder from rubber production, but also tend to undermine the social stability of the country. This is an excessive price to pay for the continued protection of the high-cost producers.



Montgomery's Elevating Table

Industrial Elevating Table

AN INDUSTRIAL elevating table designed to lift and carry safely a load of one ton has been announced by Montgomery & Co., Inc. Of steel construction throughout, the table can remain fixed in any position and has no parts to get out of order. It has proved to be a labor saver in many industrial applications since it allows one man to rearrange or transfer dies or other heavy parts during storage and manufacturing operations.

The table top measures 20 by 32 inches, and can be raised from a minimum height off the floor of 26 inches to a maximum height of 43 inches. This adjustment in height is made by a hand wheel, each revolution of which raises or lowers the table top by 3/8-inch. The table is mounted on two ball-bearing swivel casters and two stationary casters, all four inches in diameter. The overall width of the table is 26 inches, and its crated weight is 290 pounds.

EDITORIALS

How about Prices "Fixed" by Government?

EIGHT of the largest tire manufacturing companies and The Rubber Manufacturers Association, Inc., on August 17 became one of the targets of the Department of Justice's campaign into price conspiracies in a criminal complaint filed in the Southern District of New York for alleged "price fixing" and restraint of trade under the federal anti-trust laws. The complaint charged that the industry held meetings and conferences at which "prices and policies pertaining to the distribution and sale of tires and tubes were discussed, formulated and agreed upon," and that among other things, "uniform warranties and adjustment policies were decided upon for the purpose of eliminating price competition."

In view of the record of the tire manufacturing industry prior to and following the late war in increasing the miles per tire dollar furnished the motorist, it would appear that this complaint was not only unfair and badly timed, but was probably made with a realization of its value to the present administration politically. Actually, in contrast to many other major manufacturing industries, the peak production rate achieved by tire manufacturers during the last 18 months has so nearly satisfied wartime pent-up demand that the recent series of price cuts were necessary to help maintain sales. The prices of the popular sizes of passenger-car tires are now at the same level as in 1939, while the prices of almost every other article in our daily life are at much higher levels and threatening to rise even further.

It would be hard to find anyone who did not realize that the cost of living in the United States has been rising steadily at an accelerated rate since the end of the war, and, although a turndown has been anticipated for the second half of this year, by virtue of supply catching up with demand in many lines and the possibility of some degree of stability in labor costs, no appreciable price lowering has become evident except for tires and tubes, certain chemicals, and some so-called "soft goods." It may be that the administration, having contributed to a considerable extent to this acceleration in the rise of the cost of living during the past two years by encouraging and even ordering wage increases, which were followed by the inevitable price increases, feels that something must be done to divert the public's attention away from the fact that purchasing power, despite high national income, has declined. However inquiries into the high prices of food, housing, and clothing have not as yet yielded results, and with a third round of wage increases being demanded, to be followed by further price increases, public opinion may react unfavorably against the administration in the coming election year. Therefore a series of "whipping boys" must be found to occupy the stage for the next several months.

In bringing suit against the tire industry, the Department of Justice may not have too strong a case if the plan is to show from the record that this industry maintained high prices by agreement in violation of the anti-trust laws. The government's own Bureau of Labor Statistics' figures, for example, show that based on an index of 100 for 1926, during the period from May, 1946, to May, 1947, wholesale prices for textile products rose from 108.8 to 138.9, foods from 111.5 to 159.8, building materials from 127.8 to 177.0, and metals and metal products from 109.4 to 141.4, while tire and tube prices remained the same at 73.0. In June, 1947, tire and tube prices were reduced about 10% further. During this period the prices of cotton, carbon black, and labor used in tire making moved steadily upward. It would seem that this "price fixing" was the type the administration should encourage, not discourage.

On the other hand, agricultural products, including many foods and cotton textiles, have been supported by a government subsidy program initiated during the depression of the 1930's, which should have been terminated long ago. Continued artificially high prices for these products have resulted because of government "price fixing." In effect, the farmer has been partially subsidized into prosperity. The general public has little knowledge of the high cost of subsidy payments which are received by persons or corporations which do not need them or have a basic right to them. According to Senate Document No. 13, Joint Committee on Reduction of Non-Essential Federal Expenditures:

"Federal expenditures for 33 items which are subsidy payments for business and farmers totaled $13,610,911,114 for the years 1934 to 1946, inclusive, averaging $1,046,993,162 a year."

In their defense against the Department of Justice action, both in the public press and in court, the tire manufacturers might do well first to call attention to the fact that competition in the tire industry has, if anything, been too great instead of too small, as indicated by the present level of tire prices in the face of rising costs. Then the manufacturers could also point out that these rising costs in the tire industry, and the high cost of living generally, are to a considerable extent a result of the government's own encouragement of high wage levels and the continuation of subsidy payments on many products where such payments are no longer needed.

Finally, as pointed out in an *Akron Beacon Journal* editorial on August 20:

"Whether the government has actual evidence of collaboration between the companies remains to be seen, if and when the case comes to trial. It is well to remember that under the American system of jurisprudence, accused persons are innocent until proven guilty. In this case indictments have not yet been returned. The Justice Department has merely filed certain 'information' with a federal grand jury."

Scientific and Technical Activities

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution to rubber goods manufacturers together with certain reauthorizations of previously listed polymers from the Office of Rubber Reserve, RFC, under the conditions outlined in our November, 1945, issue, page 237, have been received and listed in the table below.

Normally, experimental polymers are produced only at the request of the consumers, with 20 bales of the original run set aside for distribution to other interested companies for their evaluation. Such rubber is available in quantities of one bale to two bales upon request to the sales division of Rubber Reserve within six months after the experimental polymer was produced. Subsequent production runs are made if sufficient requests are received.

It should be noted that there is no longer a premium price on black masterbatches made at the United States Rubber Co. plant at Institute, W. Va. These polymers, examples of which are X-369, X-374, and X-378, were originally indicated as premium priced when first authorized and listed in these columns.

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-398-GR-S	U. S. Rubber Institute	7/16/47	71-29 butadiene-styrene polymer similar to X-383 except that Mooney will be 50-60 instead of 60-70. Cumene hydroperoxide activation at low temperature. Glycol will not be added to the reactor charge as an anti-freeze as was done in the X-383 reactor charge.	Low temperature polymers have given indications of improved physical properties and processing characteristics. Of immediate interest in tire tread evaluation.
X-399-GR-S	U. S. Rubber Institute	7/9/47	71-29 butadiene-styrene ratio polymer, fatty acid soap emulsification, modified with tertiary C-16 mercaptan, at 25-35 Mooney, stabilized with UB-UB, salt acid coagulation.	Low Mooney polymer made to reduce the breakdown time required before compounding. Originally designed for use in chemically blown sponge. However X-399 may be of interest in many other end-products.
X-400-GR-S Latex	Firestone, Akron	7/29/47	Low modification (Sulfole B-8) latex having 75 butadiene—25 styrene monomer ratio with mixed fatty acid soap and synthetic emulsifiers. Also contains inorganic salt, sodium pyrophosphate.	Improved X-342-type latex. Reported to be a high adhesion latex for tire cord solutioning.
X-401-GR-S			A non-staining and non-discoloring GR-S-Black-1-type masterbatch containing 50 parts EPC black per 100 parts of GR-S (35-45 Mooney). Stabilizer scheduled as UBUB.	This masterbatch has not yet been authorized since insufficient permit requests have been received to warrant production. X-number will be canceled unless additional permit requests are received. Designed for cover jacket on electrical cords and mottled rubber flooring.
X-402-SP-GR-S Latex	U. S. Rubber, Naugatuck	7/29/47	Same as regular GR-S-SP except that rubber will not be strained or milled after drying.	For experimental tire tests.
X-403-SP-GR-S Latex	U. S. Rubber, Naugatuck	7/29/47	Same as X-402 except Mooney viscosity will be 55-65.	For experimental tire tests.
X-404-SP-GR-S Latex	U. S. Rubber, Naugatuck	7/29/47	Same as X-402 except Mooney viscosity will be 65-75.	For experimental tire tests.

A.S.M.E. Rubber and Plastics Group Meeting

THE Rubber and Plastics Division of the American Society of Mechanical Engineers met with the parent society at the Stevens Hotel, Chicago, Ill., on June 19, as one of the technical sessions held by the various divisions of the Society. Three papers were presented before the Division, and a joint meeting of the general, advisory, and executive committees of the Division met to plan future meetings.

The first paper, entitled "Buick Motor Mount Testing Machine," was given by Lloyd E. Muller, staff engineer of the acoustical and vibration department, Buick Motor Division, General Motors Corp. Mr. Muller noted that frequency and damping are the two factors available to work with in any vibration control problem. He briefly discussed the use of spring and shock absorbers in obtaining the smooth riding characteristics of modern vehicles. A practical method of using the frequency approach for damping transmission of engine motion became available with commercial production of high hysteresis-type synthetic rubber. This application presented the problem of measurement and control and the Buick motor mount testing machine was developed to meet this problem. The components of this machine which records the hysteresis rates of actual mountings under dynamic conditions, was described in detail by Mr. Muller, together with its method of operation.

LaVerne E. Cheyney and T. J. McCuistion, of the rubber laboratory of Battelle Memorial Institute, gave a paper on "Factors Influencing Performance of Aircraft Hydraulic Packings." The sealing of packing materials currently used in hydraulic systems for aircraft are the typical oil-resistant types of synthetic rubber. These rubbers tend to flow in a manner similar to fluids when at extremely high pressures, but they still exert considerable resistance to such flow at the same time. The effects of packing design and diametral clearance were discussed, together with the effects of operating pressure, metal finish, metal corrosion, temperature, and other factors of interest to the design engineer.

The concluding paper of the session was "Some Properties and Mechanical Applications of Compar," presented by J. J. Hitov, molding engineer of Resistoflex Corp. Detailed data were given on the resistance of the Compar resins to aliphatic and aromatic hydrocarbons and their chlorinated derivatives, together with information on the change in tensile strength of the materials after immersion in various organic solvents. Stress-strain data on five standard Compars showed the tensile strength to vary from 1,000 p.s.i. for the soft 50-durometer stock to 4,000-5,000 p.s.i. for the hard 95-durometer stock, while the elongations for all these compounds were approximately 500%. Data indicating Compar to be superior in abrasion resistance to the polychloroprenes and alkylpolysulfides were presented by the speaker, who also discussed the effect of aging on dimensional stability, tensile strength, hardness, and low temperature flexibility.

New Chemical Intermediate

LIMITED quantities of benzonitrile, a versatile chemical intermediate, have become available for study by research and development chemists through the operation of a new pilot plant by Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y. The company's research experts predicted a wide usage of the material, which may be used in synthetic resins, pharmaceuticals, and dyestuffs.

Although the versatility of benzonitrile in combining with other chemical compounds has long been recognized, lack of sufficient quantities has heretofore limited complete development of the material's entire range of usefulness. In setting up manufacture of benzonitrile on a pilot-plant scale in the company's laboratories at Paulsboro, N. J., Socony-Vacuum utilizes toluene and ammonia, facilities for production of which were greatly expanded during the war. The process embodies an application of petroleum technology to the manufacture of organic chemicals, wherein toluene and ammonia are combined chemically in the vapor phase with the assistance of a catalyst. Development and selection of the proper catalyst were achieved only after intensive research.

Benzonitrile is a high-boiling, colorless liquid with a pleasant odor resembling that of oil of bitter almonds. It has a boiling point of 375° F., a weight of 8.35 lbs./gal., and a freezing point of 9° F. It is soluble in common organic solvents, such as alcohol, carbon tetrachloride, and ether, and is essentially insoluble in water. The material is reported to have important insecticidal properties, although this phase remains to be explored further. Benzonitrile is claimed to be a solvent with definite promise where conventional solvents are ineffective, as for vinyl resins. It may be useful likewise in the rubber industry as a softening agent for natural rubber, as well as an intermediate in the development of new rubber chemicals.

Government Rubber Price Changes

THE Office of Rubber Reserve, RFC, has on hand approximately 300,000 pounds of GR-I-X, a modified polyisobutylene produced for wartime requirements. This material should find ready application in the manufacture of cements, wire and cable insulation, pressure-sensitive tapes, and moisture proofing agents, and as a plasticizer for synthetic rubber compounds, waxes, resins, etc.

Effective with sales consummated on or after July 1, 1947, the remaining quantities of GR-I-X will be sold at the reduced price of 15¢ a pound, plus the applicable uniform freight charge. The inventory of GR-I-X on hand is as follows: GR-I-X-6, Staudinger molecular weight range of 46,000-64,000, 31,775 pounds; GR-I-X-8, Staudinger molecular weight range of 65,000-81,000, 194,088 pounds; GR-I-X-10, Staudinger molecular weight range of 82,000-99,000, 72,059 pounds; and GR-I-X-12, Staudinger molecular weight range of 100,000-117,000, 2,053 pounds; making a total of 299,975 pounds. All of this material contains approximately 1% zinc stearate and 0.5% isoprene. In order to purchase GR-I-X or to obtain sales samples, application should be made directly to the Sales Division, Office of Rubber Reserve, RFC, 811 Vermont Ave., Washington 25, D. C.

The General Sales and Distribution Circular dated July 1, 1945, as amended, states that GR-M and GR-M-10 shipped from the Louisville plant will be sold by ORR at 27.5¢ a pound, plus applicable uniform freight charge; while GR-M and GR-M-10 will be sold at 29.5¢ a pound ex warehouse, Los Angeles and/or San Francisco. Effective with permits issued for delivery during August, 1947, and until further notice, GR-M and GR-M-10 shipped from the Louisville plant will be sold at 32¢ a pound, plus applicable uniform freight charge, and GR-M-10 at 34¢ a pound ex warehouse on shipments made from West Coast warehouses. The selling price for GR-M and GR-M-10 "Off Grade A" shipped from the Louisville plant remains at 15¢ a pound, plus applicable uniform freight charges.

Since the issuance of Rubber Order R-1, as amended July 14, 1947, there has been considerable confusion regarding the proper procedure for the purchase of GR-S and GR-I synthetic rubbers. While the amended order no longer requires consumers to obtain authorization from the Department of Commerce, Office of Materials Distribution (as successor to CPA) in connection with synthetic rubber, it is still necessary that requests to purchase be forwarded direct to Reconstruction Finance Corp., Distribution Department, Office of Rubber Reserve. Upon receipt of requests, that office will issue purchase permits direct to the applicant in the same manner as heretofore, if the particular type of synthetic rubber requested is available.

Requests Technical Assistance

AN INVITATION to technical societies, trade associations, and other private industry groups to cooperate with the Office of Technical Services, United States Department of Commerce, in evaluating an estimated 500,000 technical documents revealing the details of Germany's wartime industrial technology was recently issued by John C. Green, OTS director.

The documents, all on microfilm reels and in German, have been collected over the past two years by American technical investigators in Germany under OTS sponsorship. Included are 5,000,000 pages of highly technical data reproduced on 5,000 microfilm reels. As rapidly as the reels are received, OTS catalogs them and publishes the titles in its weekly "Bibliography of Scientific Industrial Reports." In order to make full use of the data the documents must first be studied, evaluated, and, in many cases, translated by technical experts. They can then be made readily accessible to all business firms, whereas very few companies have personnel who can make use of the documents in their present form.

OTS plans to compile and publish a compendium of German wartime technology based on these documents, Mr. Green stated. The material in the compendium will be divided into appropriate sections, including rubber, plastics, automotives, and others, each outlining German developments in that special field. Each section will refer to the microfilm reels containing the detailed information. However OTS can do no more than coordinate the work involved in completing the compendium, but the job can be done, Mr. Green said, if private industry will cooperate by furnishing the technical personnel to study and evaluate the documents.

The OTS director added that experts who volunteer their services to this project will benefit by being the first to scrutinize the original German material. They will be free to publish articles based on the documents in technical journals under their own names, provided the same articles are also made available for publication in the compendium. Any trade association, technical society, firm, or individual interested in assisting in the compendium project is urged to write to John C. Green, Director, Office of Technical Services, Washington 25, D. C. The letter should state the volunteer's field of interest and summarize his technical background for the work.

New OTS List

A new list of scientific and technical subject headings, covering the latest advances in the fields of electronics, explosives, ordnance, tropicalization, aeronautics, photography, metallurgy, nuclear physics, and others, has just been released by the Office of Technical Services. The new subject headings do not cover chemistry or medicine with any completeness and only supplement the headings found in the "Subject Headings Used in the Dictionary Catalogs of the Library of Congress."

The new list, entitled "Subject Headings for Technical Libraries," will be of value to libraries. Orders for the document, designated PB-79322, should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C. The report, in multilith form, comprises 167 pages and is priced at $1.50. Orders should be accompanied by check or money order payable to the Treasurer of the United States.

New Standard Hydrocarbon Samples

SEVEN new NBS standard samples of hydrocarbons have been announced by the National Bureau of Standards, bringing to 119 the number of such compounds now available for calibrating analytical instruments and apparatus in the research, development, and analytical laboratories of the petroleum rubber, chemical, and allied industries. Since the first of these NBS standard samples was made available in 1944, 100 additional compounds have been prepared through a cooperative undertaking with the American Petroleum Institute.

The seven new compounds are given in the table below:

NBS Sample Number*	Compound	Amount of Impurity† Mole %	Volume of Sample,‡ Ml.
253-5S	2,2,4-Trimethylhexane	0.30±0.20	5
542-5S	2,3,3-Trimethylhexane	0.13±0.06	5
255-5S	2,3,5-Trimethylhexane	(0.30±0.20)§	5
517-5S	n-Butylcyclopentane	0.34±0.25	5
519-5S	1-Hexene	0.14±0.08	5
527-5S	Trans-2-Hexene	0.17±0.11	5
538-5S	2-Ethyl-1-butene	0.10±0.04	5

* The designation "5S" indicates a sample of 5 ml. sealed "in vacuum" in a special pyrex glass ampoule with internal "break-off" tip.
† Purity evaluated from freezing point measurements, as described in *J. Research NBS*, 35, 355 (1945) RP1676, unless otherwise indicated.
‡ Tolerance approximately ± 10%.
§ Estimated by analogy with isomers subjected to similar purification.

Instructions for transferring standard samples of hydrocarbons "in vacuum" are available upon request. A complete list of NBS standard samples of hydrocarbons, together with instructions for ordering, may also be obtained from the National Bureau of Standards, Washington, D. C.

New GR-S Numbers Assigned

SEVERAL experimental GR-S polymers have recently been assigned to the GR-S numbered series by the Office of Rubber Reserve, RFC. These changes in designation include the following:

(a) GR-S-21 (formerly X-250 GR-S).
(b) GR-S-18 (formerly X-382 GR-S).
(c) GR-S-45AC (formerly X-317-AC GR-S).
(d) GR-S-10AC and X-306-GR-S are now interchangeable.
(e) GR-S-Black-20 (formerly X-309-GR-S).
(f) GR-S-SP (formerly Standard Naugatuck GR-S).
(g) GR-S-65-SP (formerly Naugatuck GR-S-65).
(h) GR-S-10 and X-308-GR-S will be interchangeable on January 1, 1948.

As indicated in ORR's General Sales and Distribution Circular, new experimental GR-S polymers produced in limited quantities, including experimental GR-S latices, are identified and designated by "X" numbers. Changes in status from X-numbered polymers to GR-S-numbered polymers mean that the specification covering their production is included in the Specifications for Government Synthetic Rubbers which are available to the consuming rubber industry. A GR-S-numbered polymer is available upon request to the Sales Division of Rubber Reserve at any time, provided that material shortages do not interfere with production schedules.

Many GR-S numbered polymers and latex masterbatches which have been difficult to produce in sufficient quantities to meet demand in the past are now more readily available. It is suggested that the Sales Division of ORR be contacted in regard to the availability of any specific GR-S numbered polymer, latex, or latex masterbatch which may previously have been in short supply. The difficulty in meeting this demand was mainly attributable to the limited availability of antioxidants, both standard and non-staining types, and carbon blacks. At present GR-S polymers stabilized with EFED are still in somewhat short supply.

ORR has issued technical bulletins on GR-S-60, GR-S-65, and GR-S Latex Type V; copies are available upon request.

Plastics Technology

Vinyl Elastomers for Extrusion and Molding[1]

G. W. Jargstorff[2]

IN DISCUSSING vinyl elastomers, it would be well first to outline the basic ingredients which make up an elastomer, then to discuss the processing techniques involved in their manufacture, and finally to illustrate the applications to which these elastomers have been applied.

Vinyl elastomers are composed of four basic ingredients: resin, plasticizer, stabilizer, and lubricant. Other ingredients such as colorants, fillers, flame retardants, diluents, etc., may also be included, but can be eliminated if necessary. However the four basic ingredients are absolutely essential to the preparation of a compound.

Resin

The resin is of the vinyl chloride-acetate copolymer type as represented by Bakelite Corp.'s Vinylite[3] brand plastics of the VYNW or VYNY varieties. More specifically, it is of the high chloride copolymer type. The vinyl chloride content of such resins may vary from 94.5 to 99%. The resins of lower chloride content, such as Bakelite's Vinylite VYHH or VYNS resins, may be plasticized, but do not make satisfactory elastomers. Plasticized compounds made from these latter resins are too sensitive to heat and in addition lack the elastic properties of compounds made from higher chloride resins. A molded article based on resin VYNW is elastic and resembles rubber in its general feel and appearance. On the other hand, one based on resin VYNS is rather hard and brittle.

Plasticizer

Some 30 or more plasticizers have been used to produce vinyl elastomers. However, when available, dioctylphthalate, or D.O.P. as it is sometimes known, is the most popular. This popularity is due to the material's good overall properties. It provides good low-temperature flexibility, low water and oil extractability, and low volatility. In comparison with the pasticizers available today, it is quite efficient.

Combinations of plasticizers are sometimes useful to attain specific advantages. Tricresylphosphate, for example, solvates the resin better at molding temperatures than does D.O.P. A small amount of tricresylphosphate added to a molding compound in addition to D.O.P. will result in a compound with better molded luster than one formulated entirely with D.O.P. Similarly, Flexol[3] 4GO plasticizer, if used alone, will sweat out from a molded or extruded object but if combined in the ratio of two parts to one part of D.O.P. will result in a compound quite free of sweatout.

The choice of plasticizer must be governed by the end-use to which the compound will be applied. For example, if the molded or extruded object is placed in contact with lacquered objects which may result in plasticizer migration, one of the resinous non-migratory plasticizers should be used. All of these factors have been taken into consideration in the formulation of vinyl elastomers.

Stabilizer

The function of the stabilizer is to prevent thermal decomposition of the resin. As stabilizers, the lead salts are quite popular. Basic carbonate of white lead, basic silicate white lead, and fused lead stearate are extensively used. Compounds containing the carbonate will, if processed at relatively high temperatures, result in "gassing" caused by liberation of carbon dioxide. The use of the silicate white lead eliminates this possibility. Thus the silicate is considered superior to the carbonate. Fused lead stearate is both a lubricant and a stabilizer, and its use may call for a reduction in the normal lubricant content of a compound.

Other Ingredients

Any one of a number of lubricants may be used. Those commonly used are mineral oil, stearic acid, dehydrated castor oil, and calcium stearate.

Of the fillers, the precipitated calcium carbonates seem most satisfactory, and the finer particle size fillers are preferred.

Antimony oxide is used to advantage as a flame retardant.

Processing

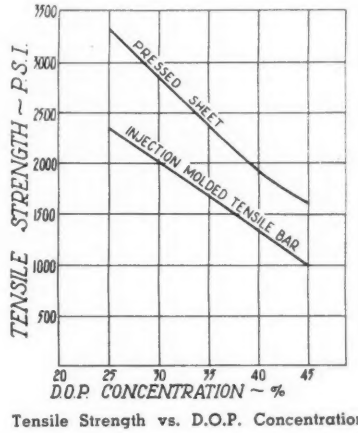
The processing of vinyl elastomers is carried out first by a thorough blending of all ingredients in an open-blade mixer until a fairly uniform mass is obtained. This is then charged into a Banbury mixer and fluxed over a period of six to eight minutes. The batch should be of such size as to obtain positive ram pressure at all times during the mixing. Too little ram pressure and too much ram pressure can be equally detrimental and may result in non-uniformity of the mix. Such a mix may extrude with a lumpy surface or may fail to hang together as it emerges from the extrusion die.

From the Banbury mixer the charge is transferred to a two-roll mill where it is given six to eight passes, being inserted endwise for each pass. The batch is then transferred to a calender or sheeting mill where it is sheeted and slit to convenient width, and finally granulated. Extrusion and molding compounds are granulated to 5/16- or 7/16-inch granules; the large-size granules are more satisfactory for extruder feed.

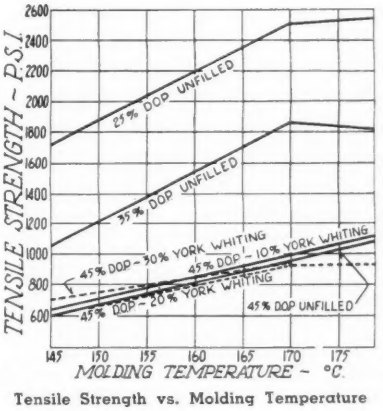
Injection Molding

For injection molding, any of the present commercial machines do a satisfactory job, provided the cylinder, torpedo, and nozzle are chromium plated. It is customary to apply 0.001- to 0.002-inch of chromium plate to these parts. Hastelloy[3] cylinder liners are a recent innovation for the injection molding of vinyl elastomers. One manufacturer who operates his equipment at unusually high temperatures has found it possible to operate for long periods of time without the need of a cylinder clean-out when using this type of liner.

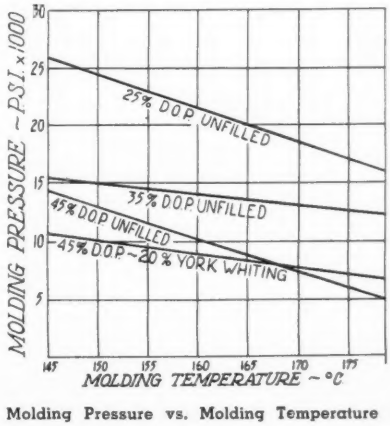
For the injection molding of vinyl elastomers, cylinder temperatures not exceeding 340 or possibly 350° F. are recommended. Temperatures in excess of these figures will eventually lead to burned material and the need of frequent cylinder clean-outs. Molding pressures will, of course, depend on the geometry of the casting, the runner size and length, the gate size, and other factors. Chromium plating of mold cavities is not recommended. High molding temperatures favor high tensile strength and elongation and low mold shrinkage. The tensile strength of injection molded parts is usually about 30-35% lower than that of compression molded parts.



Tensile Strength vs. D.O.P. Concentration



Tensile Strength vs. Molding Temperature



Molding Pressure vs. Molding Temperature

[1] Presented before the Connecticut Rubber Group, New Haven, Conn., May 9, 1947.
[2] Representative, thermoplastic technical service department, Bakelite Corp., New York, N. Y.
[3] A registered trade mark of a unit of Union Carbide & Carbon Corp., New York.

One of the most troublesome problems relating to the injection molding of elastomers has been that of mold shrinkage. Frequently customers have called to ask about the amount of shrinkage to be expected with the type of castings and the compounds they were using. A long series of tests conducted to ascertain the shrinkage obtainable with various compounds led to the conclusion that the mold shrinkage varied from 3.5 to 6.5%, and that filled compounds exhibit lower shrinkage values than unfilled compounds. Field investigation indicated that the mold shrinkage is closer to 2%, a figure which we presently recommend using in the design of injection molds.

Mold shrinkage depends on many factors, such as cylinder temperature, injection pressure, runner size, gate size, etc. Actually, the effective pressure within the cavity during molding determines the magnitude of the mold shrinkage. The more pressure transmitted from the injection plunger to the cavity, the lower will be the mold shrinkage. For molding applications which call for close dimensional tolerances, filled elastomers do a better job because their mold shrinkage can be more closely estimated. Filled compounds also exhibit lower elevated temperature shrinkage than do unfilled elastomers. If, therefore, a molded item is to be placed close to the motor of a car, or in some similar place where it will be exposed to elevated temperatures, the elevated temperature shrinkage or distortion will be less if a filled compound is used for molding the item.

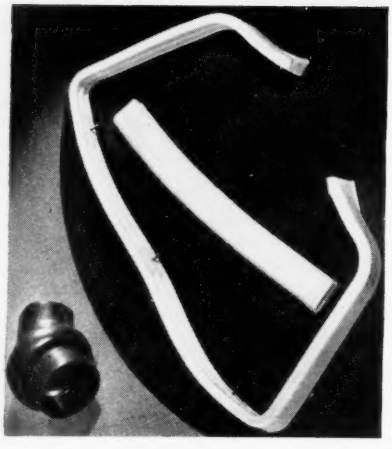
One of the most recent and unusual developments to come from Bakelite Corp.'s laboratories has been the recommendation of sprue heating. Heretofore it has been customary to operate with the sprue bushing cooled to the temperature of the stationery die, since it is a part of that portion of the die. Our laboratories have now found that much of the dullness and spottiness of injection molded castings and considerable weld line trouble is caused by excessive cooling of the plastic mass as it passes through the sprue bushing. This difficulty is overcome by the insertion of six 50-watt cartridge heaters, spaced equally about the circumference of the bushing. The use of such heaters permits lower cylinder operating temperatures and pressures and will aid in the elimination of weld lines not only from vinyl elastomers, but also from cellulose acetate, ethyl cellulose, or any of the other injection molded plastics.

Bakelite Vinylite elastomers for injection molding are designated VG-9960, -9970, -9980, and -9990; the last two figures of each designation indicating the approximate durometer "A" hardness. These elastomers are available in a fairly wide variety of colors.

Extrusion

The commercial extrusion machines currently being manufactured are all suitable for vinyl elastomers. It has been the practice in the design of such machines to recommend the use of Hastelloy Alloy "B" liners, Stellite® lands, and the use of chromium plating on the screws up to the lands. The clearance between the screw and cylinder should not exceed 0.005-inch since excessive clearance will lead to back-wash of material. Cartridge heaters, inserted in the die reasonably close to the die orifice, are recommended where high luster is desirable.

Bakelite Vinylite elastomeric all-purpose extrusion compounds are designated VG-5960, -5970, -5980, and -5990, and as with the injection molding compounds, the last two figures of each designation indicate the approximate durometer "A" hardness. These compounds are generally extruded at front cylinder, head, and die temperature ranging from 350 to 370° F. Under proper conditions they will extrude with excellent gloss.



Molded from Vinylite Elastomeric Plastics, These Flexible Vacuum Cleaner Parts Will Not, It Is Claimed, Oxidize, Harden, or Crack; They Are Produced in Colors to Match a Complete Assembly

Exposure Tests

Both Vinylite elastomeric extrusion and molding compounds have been subjected to exhaustive exposure tests in Florida, and, as a result, we are now able to formulate compounds that will withstand at least one year of continuous exposure to Florida weather. This requirement is the minimum for a compound if it is to be used for automotive applications and give satisfactory service.

We have exposed several thousand samples and have endeavored to arrive at some satisfactory correlation between outdoor exposure results and accelerated aging results. Although we are making progress in this direction, we are not at the moment able to make any accurate statements as to the comparison of one type of aging with the other. The accumulation of outdoor exposure results has been a very tedious job. No general predictions can be made as to the influence of certain ingredients on the outdoor weathering of compounds containing them, and every compound must be evaluated separately. Eventually we may get enough data to make some generalizations, but we have not yet progressed that far.

Resin Pastes

Another type of material which produces elastomers by proper heat treatment is the so-called plastisol, which is a dispersion of high chloride content copolymer resin in a suitable plasticizer. Plastisols are supplied as semi-fluid pastes and may be injected into expensive molds by means of a gear pump or grease gun. The plastisols are particularly useful for molding complicated shapes which would be difficult to injection mold because of the complexity of the mold design. They are also useful for molding castings that involve the use of delicate inserts which would move or distort under normal injection molding conditions.

New Plasticizer

PARAPLEX RG-10, a new addition to the company's series of versatile alkyd-type, polymeric plasticizing resins, and intended for use with nitrocellulose, urea, and melamine resins, has been announced by Resinous Products & Chemical Co., Washington Sq., Philadelphia 5, Pa. The new oil-modified polyester is extremely flexible and highly efficient. It is low in cost and possesses light color, improved alcohol tolerance, greater solvency for nitrocellulose, unusual pigment stability, and increased adhesion to vulcanized rubber, it is claimed. It resists ultra-violet light and does not spew even at temperatures as high as 325° F. Because of its color, durability, and flexibility, Paraplex RG-10 is recommended for use in high-quality nitrocellulose coated fabrics, in white lacquers for rubber articles, and in tough, oil-resistant cable coverings.

Flame-Resistant Plastic

A NEW plastic resin monomer, diallylphenylphosphate, was recently announced by Victor Chemical Works through James M. Gillet, director of industrial research. The monomer polymerizes to a hard, thermosetting resin which is said to be unusual in flame resistance, extinguishing itself in 30 seconds after removal from the flame.

The monomer polymerizes with other monomers such as methyl methacrylate, vinyl acetate, diallyl phthalate, diallyl succinate, diallyl oxalate, and unsaturated alkyd resin mixtures. When polymerized with other monomers, the new resin carries along its flame resistance properties. When copolymerized with an inflammable material, such as methyl methacrylate, when it composes 20% or more of the copolymer, the diallylphenylphosphate produces a resin with good flame resistance, and at the same time the methyl methacrylate is converted from a thermoplastic resin to a thermosetting resin.

The new resin is expected to find its widest use as a reinforcing material for other plastics. It will be produced on a semi-works basis within a short period of time.

Trade Lists Available

The Commercial Intelligence Division of the United States Department of Commerce recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Division and from Department of Commerce field offices. The price is $1 a list for each country.

Plastic Material Manufacturers and Molders of Plastic Products—Argentina; Cuba; Palestine; Chile.

Aircraft and Aeronautical Supply and Equipment Importers and Dealers—Canada; Colombia; Ecuador; Guatemala; New Zealand; Paraguay; Union of South Africa.

Automotive Equipment Importers and Dealers—Norway; Ireland; Tunisia; Philippine Islands; Syria and Lebanon.

Boot and Shoe Importers and Dealers—Iran; Turkey; Portugal.

Boot and Shoe Manufacturers—Bolivia.

Chemical Importers and Dealers—Netherlands; Canada; Martinique; Paraguay.

Dental Supply Houses—Syria and Lebanon.

Electrical Supply and Equipment Importers and Dealers—Finland; Bolivia.

Office Supplies and Equipment Importers and Dealers—Netherlands India; Australia.

RUBBER WORLD
NEWS of the MONTH

Highlights

With the resumption of hearings on legislation on rubber policy in the fall, it has been indicated that a proposal more acceptable to the industry than the ANMB Bill will be presented to Congress in January, 1948. The Department of Justice initiated court action against tire and tube brake lining manufacturers, accusing them of violations of the anti-trust laws. Indignant protests were immediately forthcoming from spokesmen for these industries, and a "fight to the finish" was promised by these manufacturers. Production for the entire rubber goods industry continued at a high level, but caution with regard to the planning of future production schedules became the order of the day. The Big Four companies agreed to a discussion of further wage increases with the URWA, and the Goodyear Tire & Rubber Co reached a settlement with the union for six paid holidays instead of any direct wage increase at the present time. The B. F. Goodrich Co. began negotiations with the union both on the wage issue and the issue of a new working conditions contract after the union threatened a strike in seven of the Goodrich plants if the company would not bargain on working conditions on a company-wide basis.

Tire and Brake Lining Industries Accused in Anti-Trust Suits; Rubber Policy Formulation Lags

With Congress in recess, progress toward formulation of a national rubber policy lagged. Hearings will be resumed in the fall, and at about that time it is expected that the industry will make specific recommendations regarding the action it would like Congress to take in this matter. The tire and brake lining branches of the industry were the targets of anti-trust action by the United States Department of Justice. Vigorous denials of the accusations were made by industry spokesmen, and it was indicated that the industries concerned would put up a strong fight in order to remove the implication that they were to be classed as price racketeers. In general, overall industry production was maintained at a high level as compared with prewar, but was somewhat under the rate for the first half of 1947. The mechanical goods industry was reported to have concluded the best year in its history for the period ending June 30.

Rubber Policy Activity

A copy of the complete speech made by Rep. Paul W. Shafer, chairman of the House Armed Services Subcommittee on Rubber, in the House of Representatives on July 21 has been received and includes certain information in addition to that reported last month on the matter of the legislation proposed by the Army-Navy Munitions Board and the future plans of the subcommittee for formulating national rubber policy legislation.

It was pointed out that the United States is the largest importer of natural rubber in the world and if we were to manufacture domestic rubber entirely and no longer import any natural rubber, we would affect disastrously the economies of many nations. It is not our desire to do that, Representative Shafer said. After reviewing the problems to be solved in connection with the question of how much, what types, and where the domestic synthetic to be produced is to be used, the effect of the future synthetic rubber program upon world markets must be considered, he added. Also, the final rubber program should involve the barest minimum of government control.

With the benefit of the views of the Army-Navy Munitions Board and with the advice of industry, the subcommittee is confident that it can present to Congress in January a workable, efficient bill which will accomplish the purpose desired, it was said. The subcommittee will meet during the Congressional recess and hold hearings on the entire rubber situation.

Ways and means of establishing a program that will permit maximum use of natural rubber by United States manufacturers of rubber goods, and at the same time assure consumption of a sufficient amount of synthetic rubber to maintain a synthetic rubber producing industry, were discussed at a meeting of the Rubber Industry Advisory Committee and officials of the Office of Materials Distribution, United States Department of Commerce, held in Washington, D. C., during the week of July 21. Until Congress enacts legislation establishing a long-term national rubber policy, OMD will continue to set product specifications calling for the use of synthetic rubber in varying proportions, it was reported. Another revision of Rubber Order R-1, due September 1 is expected to permit the use of increased amounts of natural rubber (except latex) in all rubber products except tires and tubes. The existing percentages on tires and tubes will remain unchanged.

Despite the present unsettled conditions in Java and Sumatra, world availability of natural rubber is rapidly approaching a point where it is reasonable to expect that United States supplies will be more than enough to meet consumption demand, officials of OMD's Rubber Division said. Under such circumstances, voluntary use of synthetic rubber would not be in sufficient volume to support the industry, they added.

At the last Rubber Study Group meeting in Paris early in July it was requested that all nations encourage world trade in natural rubber. The United States is cooperating with this policy to the maximum extent consistent with maintenance in this country of the minimum production of synthetic rubber required for national security and the public interest, OMD explained.

No decisions concerning the final-program for synthetic rubber were reached at the Washington meeting since it was found that the problem requires wider study and consultation with a broader range of industry than was represented at the meeting.

It is understood that representatives of the rubber goods manufacturing industry will submit to the House subcommittee their proposals for rubber policy and legislation in the near future. Mandatory use of synthetic rubber is not expected to be included in these proposals.

It was also reported during August that the rubber goods industry had submitted to the Office of Rubber Reserve a new plan for modifying the patent pool agreement signed in 1941. The new plan aims to assure the government that it will continue to benefit from any discoveries that can be put to use in the period of federal ownership and to assure the companies that they can pursue long-range projects at their own expense, keep them secret, and put them to use when the government gets out of the synthetic rubber business. Rubber Reserve officials are sympathetic with the objectives of the plan, but want to be sure the government will not be deprived of any ideas that might enable it to make synthetic rubber cheaper or better while it still owns and operates the majority of the plants.

The administration has promised to sell or lease the synthetic rubber plants, together with the facilities for making butadiene, as soon as it can find purchasers. Prospective buyers are holding back until Congress decides what kind of help it is going to give the synthetic rubber industry after the current controls expire.

Rubber Reserve points out that one thing any purchaser will want is assurance that he can use the plant without fear that he will infringe on any old patents. The December, 1941, agreement gives him that assurance, and this provision must be part of any new plan that is adopted.

Howard H. Heilman, industrial consultant and formerly associated with the Office of Rubber Reserve, writing in Lockwood's August 15 "Rubber Report" on rubber policy, states that if national security and free enterprise are basic considerations in the formulation of any rubber policy, it seems reasonable to say that we have national security with respect to rubber. We can continue that security with the maintenance of very minimum quantities of both synthetic and natural rubber (100,000 tons of each type, i.e., natural and GR-S) in government controlled inventory and a single restriction in connection with some of the synthetic rubber facilities. During peacetimes industry must of necessity maintain its own working inventory.

The single restriction is that the entire synthetic rubber industry and facilities should be sold to private enterprise, and if no company is interested in buying these facilities, then the government should maintain in standby condition, with no production, low-cost petroleum based plants which equal a capacity of more than 500,000 tons a year. In the event of sale of any given portion of the synthetic rubber facilities, the purchaser should be required by the government either to guarantee a minimum production rate in those facilities of a type of synthetic rubber, or in other facilities later constructed by private enterprise, or to maintain the equipment in good standby condition.

Mr. Heilman makes the point that with respect to synthetic rubber it is foolhardy to assume that the use of a product will not increase continuously when its availability has been guaranteed by a process which gives low cost, absolute uniformity, and also freedom from any violent price changes.

Lockwood's August 15 "Rubber Report" also contained comments by Ralph F. Wolf on reactions he had received on his article, "Synthetic Rubber—A Protected or a Free Industry", first published in Lockwood's Report for July 15 and reprinted in our August issue (page 641). Mr. Wolf's comments follow:

"The reactions I have received so far to the article have for the most part been favorable. One government official took exception to some of my statements in a very interesting letter. He agrees that styrene presents no problem and that copolymer facilities offer only a minor problem. He feels that a considerable production of butadiene should be maintained, and since there is no large alternative use for it, synthetic rubber will have to be made from it. Refinery operators advise that if feedstocks for butadiene are diverted to other uses, it would be difficult to recapture them. The particular cut used is in great demand for high-octane gasoline.

"I cannot agree that it is necessary to keep part of this channeled into butadiene production indefinitely just in case there might be another emergency. In the event there is another emergency, facilities for production of this type of hydrocarbon will have to be expanded anyway. The total amount of expansion will have to be exactly the same regardless of what is done now. If some facilities are reserved for butadiene now, a little greater part of any future expansion will have to be earmarked for high-octane gasoline. If present feedstocks all go into high-octane fuel, then part of the future expansion will have to be for rubber butadiene, but a lesser amount will be needed for the fuel program.

"Obviously there will have to be some kind of referee, such as the WPB was, to decide how much available feedstock goes to fuel and how much to rubber. To deny that this will be done effectively is no argument at all. If it cannot be done, then there would be nothing to stop the military from seizing all feedstocks for aviation fuel, anyway, even those which might have been going into butadiene for a long period of time."

Tire Industry Suit

The Federal Government Justice Department filed a criminal complaint on August 17 against eight rubber companies, ten company officials, and The Rubber Manufacturers Association, Inc., accusing them of having conspired since 1935 to fix the prices of automobile tires and tubes, and determine other trade practices on a uniform basis. The defendant companies were Dayton Rubber Co., Firestone Tire & Rubber Co., The General Tire & Rubber Co., The B. F. Goodrich Co., Goodyear Tire & Rubber Co., Lee Rubber & Tire Corp., Seiberling Rubber Co., and United States Rubber Co.

The complaint charged in general that the defendants "have held meetings and conferences within the said district [Southern District of New York] at which prices and policies pertaining to the distribution and sale of tires and tubes were discussed, formulated and agreed upon" and from time to time have communicated with one another orally and in writing to discuss and determine prices and price policies.

The effect of the alleged conspiracy, according to the complaint, has been to suppress competition unreasonably and to restrain interstate trade in violation of the Sherman Act.

Besides alleged uniform price agreements the defendants are accused of having agreed on discounts, allowances, and bonuses. Uniform warranties and adjustment policies were decided upon for the purpose of eliminating price competition. Competition was curtailed further by the allocation of sales to agencies of state, county, and municipal governments, by agreeing not to produce certain types of tires and tubes and by agreeing on prices for slightly imperfect, obsolescent, and slightly used tires and tubes.

According to a spokesman for the Justice Department, the investigation of the tire and tube industry has been under way since March, 1946, and was prompted by "numerous complaints from independent tire dealers and others concerning the pricing practices of tire manufacturers."

Comments by rubber company officials were forthcoming at once. E. J. Thomas, Goodyear president, issued the following statement:

"We are totally amazed that the government has taken such action against the rubber industry.

"It seems utterly preposterous—here is an industry which has led all others in the effectiveness of its postwar contribution to national economy. We were the first to fill the war created void in an essential civilian product, tires. We were the first to get our product down to prewar prices (the 6.00 by 16 tire, first quality, is right now below the 1939 level). We were in the vanguard of all American industry in increasing employment and raising wages.

"I thought that was the kind of performance the government wished to encourage. I should think that kind of record would put us on the government list of shining examples rather than on some kind of a blacklist. What can be back of it?

"Not only has our record of reconversion been outstanding but so, too, was our contribution to the war effort. We produced in almost miraculous fashion a substitute source of supply of a basic commodity without which our nation could have been defeated—I'm talking about the synthetic rubber which kept the wheels of our economy and our military machine turning toward victory after the enemy had seized the source of 90% of our natural rubber. We went far afield, too, into the production of guns, ammunition, planes and essential parts for almost every one of our weapons. For this we got all manner of commendations and awards.

"And long before the war, in fact during the entire 50 years of our modern history, as an industry we have turned in outstanding performance in the interest of the consumer. Ask any tire consumer if he thinks he has been gouged.

"We certainly are going to fight these charges to the limit."

Herbert E. Smith, president of U. S. Rubber, in his comments on the action by the Department of Justice, had the following to say:

"This action is incredible. It is incerdible in view of the splendid record of the rubber industry in supplying tires needed for the war effort. It is incredible in view of the industry's record of reconverting to meet the backlog of demand for tires for civilian needs after the war. It is incredible in view of the industry's unparalleled record in supplying tires at the present time at prices comparable to prewar prices.

"We ask you to compare prices of four top-quality passenger-car tires as they were in 1939 and as they are today:

Tire Size	1939	1947
6:00x16	$15.50	$15.56
6:50x16	18.85	18.74
7:00x15	20.80	20.75
7:00x16	21.35	21.31

"These four sizes account for 85% of all passenger-car tires made. You will note that three out of four cost the consumer less today than they did before the war, and that the fourth costs only six cents more.

"And these prices exist in the face of tremendously increased manufacturing costs. The price of rubber, the principal raw material in a tire, is about the same as before the war, but cotton, which is the next largest material cost factor, has been increased 289%, the price of carbon black has more than doubled, and wages are now 60% higher.

"The question naturally arises as to why tire prices are so low, especially when almost every other article of our everyday life is so high, with some threatening to go still higher. The answer is twofold:

"First, the tire manufacturing companies have shown unusual good judgment in wanting to hold prices down to a reasonable level. Second, the forces of competition, which are unique in the American system of free enterprise, are at work in the interest of the consumer. Supply has at last caught up with the big backlog of demand for tires, which was built up in the war, with the result that a highly competitive situation prevails. The consumer is the winner.

"The action of the Department of Justice is inconsistent with the recently announced intention of the Administration to prosecute price racketeers.

"The world's best bargain today probably is the automobile tire. Twenty years ago the average motorist got 432 miles per tire dollar. Ten years ago he got 800 miles per tire dollar. Today he gets 1,600 miles for every dollar he spends for a tire. In other words, today he gets four times as much value for his tire dollar as he did twenty years ago.

"The United States Rubber Co. has always devoted itself to supplying the public with the best possible quality at reasonable prices. To brand this company, or the industry, in the mind of the public as a price conspirator injurious to the American public is entirely unjustified. Our company will resist this charge to the utmost."

A full denial of the government allegations was contained in a statement issued by the Firestone company, which said specific charges would be answered "at the proper time."

"In the face of sharply rising prices generally, Firestone has rendered an outstanding service to car owners in reducing the prices of first-quality tires to lower than prewar levels," it was said.

The statement quoted Commerce Department figures showing a cost-of-living increase since May, 1941, of 51.4%, and pointed out that during the same period the price of tires had decreased 2.4%.

"This is defeating the forces of inflation," the company stated, "and is a notable example of competitive free enterprise in action."

William O'Neil, president of General Tire, criticized the Attorney General in connection with the housing, food, and clothing inquiry.

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MANUFACTURER DISTRIBUTOR

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

VFF (Very Fine Furnace)

STATEX-K

◆

FF (Fine Furnace)

STATEX-B

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

◆

COLUMBIAN CARBON CO. — MANUFACTURER

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"It seems strange," he said, "that the Department of Justice fires only verbal guns at industries putting price rises into effect, but files criminal charges at one of the few industries cooperating wholeheartedly with the President's fight against inflation."

He added that the complaint "just doesn't make sense; it won't add up."

Col. J. L. Cochrun, vice president in charge of sales, Seiberling Rubber Co., stated that the action of the Attorney General comes as a surprise.

"We have had no opportunity to study the charge, and until we do we can make no comment. However, we strongly believe there is no justification for the charge."

Brake Lining Group Indicted

Twenty manufacturers of replacement brake and clutch lining materials, including several well-known rubber firms, were indicted by the Federal grand jury in New York on August 21, also on charges of violating anti-trust laws. Attorney General Tom C. Clark was reported to have pointed out that the industry does a $45,000,000 annual business and that the pricing and other trade practices especially affect Federal and State Governments, municipalities, and other large operators of automotive equipment.

Vincent A. Spina, president of the Brake Lining Manufacturers Association, described as "preposterous" the assertion by government officials that the anti-trust actions would promote highway safety.

"The brake lining and clutch facing business is one of the most intensely competitive businesses in the country," he said. "Profit margins are always narrow and, although since 1940 basic material costs have increased approximately 50% and labor costs are up about 80%, the prices for these materials have advanced on an average of 12%, although the OPA itself authorized an increase as high as 15%.

Furthermore, it was said, brake linings which contribute so much to public safety are a vastly improved product technologically over the prewar ones.

Included among the companies named in the indictment were the Firestone Tire & Rubber Co. and the Firestone Tire and Rubber Export Co., both of Akron, O.; Grizzly Mfg. Co., Bell, Calif.; Johns-Manville Corp. and Johns-Manville International Corp., both of New York, N. Y.; Pharis Tire & Rubber Co., Ridgeway, Pa.; Raybestos-Manhattan, Inc., Passaic, N. J.; and The Thermoid Co., Trenton, N. J.

Industry Production Activity

It is generally considered that the production level of most branches of the rubber goods manufacturing industry during August returned to a point approximating that of the first half of the year. In view of high materials and labor costs, however, management executives seemed to be following a policy of caution with regard to any large increase in production rate or inventories of finished goods.

Recently reported statistics by the United States Department of Labor for the first five months of the year indicated a decrease in employment in the industry for May of about 7%, based on the January, 1947, figure. It appears as though about 5% of this 7% reduction in employment took place in the tire and tube industry and 2% in the mechanical and general products branches.

According to the OMD, consumption of rubber during June was as follows: natural, 42,541 long tons (including 884 tons of latex); GR-S, 34,033; neoprene, 3,002; Butyl, 4,984; and nitrile types, 339 long tons. Total consumption of both natural and synthetic rubbers was 84,899 long tons.

New supply and production of these rubbers amounted to: natural rubber, 53,049 long tons (including 790 tons of latex); GR-S, 29,377; neoprene, 2,045; Butyl, 3,748; nitrile types, 527 tons.

Stocks on hand at the end of June were reported as: natural, 341,468 long tons (including 5,197 tons of latex); GR-S, 68,326; neoprene, 5,806; Butyl, 19,011; nitrile types, 4,032 tons.

The RMA reported shipments of passenger car tires by manufacturers during the first half of 1947 totaled 36,323,946 units, as compared with 30,648,535 units during the same period last year, an increase of 18.5%. During June passenger-tire shipments increased 5.38% over May; while production and inventory declined, 6.5% and 4.1%, respectively. Truck and bus tire shipments were 5.4% less than for May; while production was below the previous month by 6.2%. At the same time inventory increased 8.9%. A complete table of these statistics will be found in the enlarged section on statistics in the back of this issue.

The Natural Rubber Picture

According to recent reports, the lower price level for natural rubber during the past few months has not caused any decrease in the production of rubber in Malaya. Latest figures show an increase from 29,000 tons in June to 31,000 tons in July, and August is expected to be even higher. Although more difficult to check, production from the Netherlands India has been at about the same 30,000-ton-a-month level, with about half of this passing through Singapore, and the other 15,000 tons exported directly from Java. With the on-again, off-again fighting between the Dutch and Indonesians during August, exports will probably be erratic. Additional stockpiles of rubber captured by the Dutch, however, may increase the total rubber available.

In Malaya, rubber production by both the large estates and smallholders was on the increase. It will take a long time, reports state, before estate growers are discouraged by lower prices to the point of closing down entirely, although there are some estates whose financial position is particularly tight because of high material and rehabilitation costs, which could not withstand an indefinite number of losing years.

Two factors are operating immediately against the shutting down of areas now in production: one is the decrease in unit costs corresponding with increased latex production; the other is the tendency to throw as much rubber as possible on a falling market before prices go lower. The latter factor is confirmed by the increase in stocks in Malaya which rose from 60,000 tons in May, to 70,000 in June and 97,000 in July.

W. A. Stanton, a retired rubber planter whose experience over many years in Malaya cover both prewar and postwar conditions, writing in Lockwood's August 15 "Rubber Report" on the plantation industry, states that this industry's problem is to get production way up and costs way down. To do this the industry must operate through larger, consolidated, and more efficient units. In the field, methods to cut manhours must be found. Five-hundred-pounds-per-acre rubber is now as obsolete as indigo became upon the introduction of aniline dyes which forced out of existence a large plantation industry. Fifteen-hundred-pound-per-acre rubber can be produced profitably at a cost with which no general-purpose synthetic can ever compete, and it is possible that special-purpose rubbers may be developed which can be produced at costs which will supplant the special-purpose synthetics, Mr. Stanton said.

Arthur Nolan, of Latex Distributors, Inc., also writing in Lockwood's August 15 Report, states that estimated stocks of natural latex in the United States on June 30, 1947, amounted to about 7,530 long tons, dry weight. Estimated receipts for the third quarter were 6,511 tons. Authorizations for consumption and reexports were estimated as about 8,000 tons for the third quarter.

The current situation in Java and Sumatra has, as yet, had no effect on supply as no significant quantity of natural rubber latex was expected from these areas during 1947. Prices are firm at current levels, which have persisted for about two months. The rest of the world, particularly Continental Europe, is paying appreciably higher prices than the United States, Mr. Nolan said.

Sears Resigns

Resignation of W. J. Sears, Chief of the Rubber Division of the Office of Materials Distribution, was announced August 22, by H. B. McCoy, OMD Director. Mr. Sears entered government service in July, 1941, with the Office of Production Management, and served continuously with OPM and its successor agencies, the War Production Board, Civilian Production Administration, and OMD. In September, 1944, he became Assistant Director of WPB's Rubber Bureau. Under CPA, he was Director of that agency's Rubber Division and continued as division chief when CPA's few remaining functions were transferred to OMD.

Mr. McCoy praised the retiring official's work, saying "Mr. Sears has worked in close cooperation with the rubber industry, obtaining its advice and participation in the solution of many problems. Through his able leadership, he has brought to successful conclusion the reconversion from use of synthetic to natural rubbers, to the maximum degree compatible with national security. With the attainment of this goal, and since his intentions never were to make government work his career, he considers his job finished."

Prior to the emergency period, Mr. Sears was employed by the United States Rubber Co. He was born in Columbus, O., in 1913, and was educated at the Georgia School of Technology, Ohio State University, Wayne University, and the Detroit College of Law.

War Assets Administration, Washington, D. C., in its recent listings of surplus products for sale included 3,600 one-clamp tube vulcanizers; rubber gaskets and rubber tank fuel containers; raincoats; and telephone and telegraph wire and cable.

Armstrong Cork Co., Lancaster, Pa., plans construction of new laboratories for industrial research and development, to be completed within two years. The company has also scheduled additions to its general offices which would increase available office space about 30%.

Management-Labor Relations

In reopening the March 22, 1947, Big Four wage agreement, the URWA requested negotiations on that basis, but replies from the companies concerned, Goodyear, Goodrich, Firestone, and U. S. Rubber, insisted that the negotiations be carried out individually by each company. The union agreed to this plan, and discussions began with the Goodyear Tire & Rubber Co. in Cleveland, O., in mid-August. An agreement between the company and the union for six paid holidays a year, in lieu of further wage increases at the present time, was reached. The strike scheduled to take place at the plants of The B. F. Goodrich Co. because of the dispute between the URWA and the company over the demand of the union for a company-wide contract on working conditions was called off when the firm agreed to negotiate on a company-wide basis. Cyrus S. Ching, recently retired expert on industrial relations for the United States Rubber Co., was appointed head of the new independent Federal Mediation and Conciliation Service by President Truman.

The Wage Increase Negotiations

Following the request of the URWA under the terms of the March 22, 1947, Big Four wage agreement that the question of further increases could be reopened in four months, the union during July asked for a discussion of further increases in view of the increase in the cost of living since January, 1947. The companies replied that they were willing to discuss the matter, but not on a Big Four basis. Negotiations between Goodyear and the union during August resulted in a new agreement for six paid holidays a year instead of further wage increases at the present time. The holidays selected were New Year's Day, Memorial Day, July 4, Labor Day, Thanksgiving, and Christmas. It was also stipulated that general wage levels could be renegotiated at any time on 60 days' written notice.

The new agreement was announced in a joint statement by representatives of the union and the company and included the following comment:

"It is conceded that this additional gain by the rubber workers makes the 1947 wage settlement at least equal to other 1947 wage settlements attained by other major unions."

Negotiations between Goodrich and the union also began in August, but no information is available regarding the scheduling of wage increase negotiations between the union and Firestone or U. S. Rubber.

Goodrich Contract Dispute

The dispute which began in July between the Goodrich company and the URWA over the basis (company-wide or by individual plants) of their negotiations for a new contract on working conditions produced a strike call for August 14 to 19 at the seven Goodrich plants unless the company agreed to bargaining on a company-wide basis. The company in a statement made public on August 13, finally decided in favor of the method demanded by the union:

"The B. F. Goodrich Co. believes the mutual interests of its employes and the company are best served and industrial harmony better maintained where collective bargaining is conducted on a local plant basis as contrasted with bargaining on a so-called company-wide basis.

"However, in recognition of the belief of the URWA that good relationships between the union and The B. F. Goodrich Co. can best be furthered by negotiation on a 'company-wide' basis, the company will meet with representatives of the United Rubber, Cork, Linoleum & Plastic Workers of America to negotiate a company-wide contract for the seven Goodrich plants where the union is the bargaining agent.

"The decision to negotiate on a 'company-wide' basis will result in the continued operation of the seven Goodrich manufacturing plants to meet customer demands for finished products and will avoid the loss of millions in payrolls and sales which could have resulted from a strike in these plants."

The union called off the company-wide strike on August 13, but 750 workers at the Tuscaloosa, Ala., plant walked out two days ahead of schedule. The company refused to go ahead with the contract negotiations until the workers at Tuscaloosa returned to their jobs. The start of the negotiations between the company and the union was delayed by this unscheduled walkout, but got under way in Cleveland, on August 19. The wage increase request of the union was also to be discussed at the same time at this meeting.

Miscellaneous News

After some temporary delay working conditions contracts were signed between The General Tire & Rubber Co.'s, plant and Local No. 9, URWA, and between the Firestone plants in the same city and Local No. 7, URWA, during the past month. These were the first two contracts signed in the rubber industry since the passage of the Taft-Hartley Act.

A walkout by 450 members of the local union at the Detroit, Mich., plant of U. S. Rubber, on July 24, had the result of closing the entire plant within the course of the next two days. In spite of an order to return to work from the headquarters office of the international union followed by an advertisement in the local papers by these union officials in which they pointed out that this wildcat strike "may result in irreparable damage to you as individuals and to your organizations" the strike continued until August 6. It was settled by the efforts of L. S. Buckmaster, international union president, and E. M. Cushing, director of industrial relations for the company, at a meeting in New York, N. Y. The workers, who struck in protest against alleged cutting of job standards, returned to their jobs, after which negotiations will be started in an effort to settle the difference.

Japanese Products Export Listing

The first detailed listing of Japanese made commodities available for export from Japan to foreign markets has been received, the United States Department of Commerce, Washington, D. C., recently announced. Transmitted by the Supreme Commander of the Allied Powers, the list includes 205 products falling into 37 general categories. Accompanying each item are the estimated stocks on hand as of August 1 and in many cases the anticipated production for August and September. The 37 commodity groups include chemicals and minerals, rubber industrial belting and hose, rubber products, sporting goods, and toys and holiday goods, among others.

September 1 has been tentatively set as the date when American business men can enter into actual purchase and sales contracts and into other transactional communications for the listed and other Japanese commodities. Details on living arrangements have been made for American business men in Japan. Charges are to be made on a flat-rate basis of $10 per day, including lodging and meals. Charges for miscellaneous services, including travel, will be made at dollar rates, using military payment certificates. Private living arrangements can also be made between visiting businessmen and Japanese individuals using native currency.

NEW ENGLAND

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., has announced that William D. Schaeffer recently joined its research and development staff. Mr. Schaeffer was awarded his M.S. degree by Lehigh University in the field of physical chemistry after he returned from service overseas in the meteorological service of the United States Army Air Forces. At Lehigh, Mr. Schaeffer specialized in surface studies of phthalocyanine, an extremely stable, inert, organic pigment. His work there was done in conjunction with the National Printing Ink Institute. Mr. Schaeffer has been assigned to research under W. R. Smith, chief research chemist at the Cabot laboratories in Boston.

Davol Rubber Co., Providence, R. I., plans additions to several buildings at its plant, at an estimated cost of $35,000.

Rhode Island rubber industry in June, according to a recent report by Joseph T. Cahir, Acting Director of Labor, paid out average weekly wages of $47.80, 0.1% less than the May figure, but 10% above earnings in June, 1946. The respective figures for all manufacturing industries in the state were $45.42, plus 1.3%, and plus 8.5%. The average work week in Rhode Island manufacturing plants in June was 40.5 hours, down 3.1% from June, 1946, but up 0.7% from May, 1947. The rubber industry, however, had an average work week in June of 42.3 hours, tied with the machinery trade for the longest in the month, but the figure was 0.9% less than hours worked in May and 1.9% less than in June, 1946.

The Crescent Co., Inc., manufacturer of automotive wires and cables, Pawtucket, R. I., recently announced through Factory Manager W. A. Demers the appointment of Urbain J. H. Malo as chief chemist. Various phases of operation under the jurisdiction of his office include quality control, specifications, and research. Mr. Malo's previous connections had been with Firestone Rubber & Latex Products Co., Anaconda Wire & Cable Co., and United States Rubber Co. Two recent additions to his staff are Earl H. Ashley, Jr., formerly with E. I. du Pont de Nemours & Co., Inc., and Donald P. Kinniburgh, formerly with Anaconda and General Insulated Wire Works, Inc. Mr. Ashley is engaged in the development of new braid and lacquer constructions; while Mr. Kinniburgh is concerned with the setting-up of manufacturing specification.

PACIFIC COAST

B. E. Dougherty

Opens New Branch

The B. E. Dougherty Co., 1807 E. Olympic Blvd., Los Angeles 21, Calif., has established offices and a warehouse at 725 Second St., San Francisco 7, with Arthur E. Wolff manager of San Francisco operations. This branch will handle approximately the same materials as does the Los Angeles office and will service the consuming trades in northern California, Oregon, and Washington.

The company, organized some 20 years ago by B. E. Dougherty, who still controls it, operates as manufacturer, manufacturer's representative, and jobber of chemicals, pigments, and raw materials to the rubber and similar industries in the Pacific Coast area. Among the companies which Dougherty represents are: Godfrey L. Cabot, Inc., General Atlas Carbon Co., W. C. Hardesty Co., Inc., American Turpentine & Tar Co., Ltd., Glidden Co. (naval stores division), Crowley Tar Products Co., Franklin Mineral Products Co., Sierra Talc & Clay Co., The Holliston Mills, Inc., Hardesty Chemical Co., Inc., Progressive Varnish Works, and John R. Spellacy Co. In addition the Dougherty company manufactures inerts.

Mr. Wolff, who joined the organization on June 1, had been associated with New Jersey Zinc Co. in the Pacific Coast area for more than 20 years; his work was in connection with the sale of zinc oxide and related products. He has served as southern California manager, at Los Angeles, and then as assistant to the Pacific Coast manager, at San Francisco, for New Jersey Zinc. Mr. Wolff attended the University of California. He is married and has three daughters.

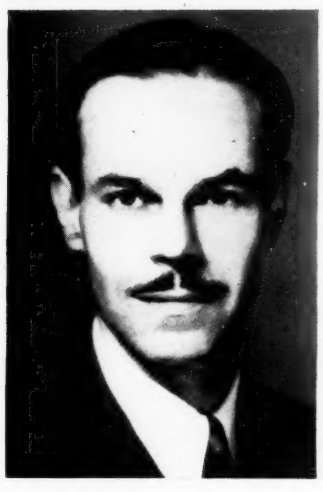
General Atlas Appoints Dougherty Pacific Coast Agent

General Atlas Carbon Co., a subsidiary of Godfrey L. Cabot, Inc., Boston, Mass., has appointed the Dougherty company its exclusive agent on the Pacific Coast for the sale of General Atlas carbon blacks, Gastex and Pelletex. This announcement was made to West Coast rubber manufacturers by Carl J. Wright, General Atlas vice president. In a letter to members of the industry Mr. Wright said, in part:

"The B. E. Dougherty Co. will handle your carload and less-carload orders for Gastex-Pelletex, give you prompt information regarding products, prices, orders and shipments, and maintain the General Atlas standard of good customer-supplier relationships."

Mr. Dougherty and his staff have been selling agents for rubber grades of Cabot carbon black in the Los Angeles area for many years. By this announcement, General Atlas Gastex and Pelletex are added to the list of Cabot products provided rubber manufacturers.

The new arrangement expands application of a policy adopted some time ago to coordinate Cabot and General Atlas sales and distribution services to the rubber industry. Several months ago General Atlas eastern agents, Herron Bros. & Meyer, took over the sales of Cabot carbon blacks in some parts of the country, and the Cabot technical sales and service staff under Owen J. Brown, Jr., general sales manager, became General Atlas representatives in other areas.



Arthur E. Wolff

The National Association of Foremen, 321 W. First St., Dayton 2, O., will hold its twenty-fourth annual convention at the Philharmonic Auditorium, Los Angeles, Calif., September 18-20. Among the members of the industrial reference committee are A. L. Freedlander, president, Dayton Rubber Co., Dayton; John G. Gates, secretary, Gates Rubber Co., Denver, Colo.; W. M. Jeffers, vice chairman, Union Pacific Railroad Co., Los Angeles; and J. M. Miller, factory manager, United States Rubber Co., Los Angeles. Mr. Freedlander, incidentally, is one of the founders of the formen's association.

Franklin Rubber Co., 1931 N. Broadway, Los Angeles, will erect two stockrooms at 419 S. Hindry St., Inglewood, both in Calif. The aluminum structures will contain 2,400 square feet of floor space and cost about $20,000.

Camelback Test

W. J. Voit Rubber Corp., Los Angeles, Calif., has contrived its most grueling test for Voit camelback through its current sponsorship of a midget racing car in the weekly midget auto races in the Los Angeles area. Rolling on stock recaps fashioned from the famous Voit Invincible truck-type rubber camelback, veteran racing driver Lou Foy each week sends his Offenhauser racer around both dirt and asphalt ovals at speeds frequently over the 130 m.p.h. mark and has often brought the "Voit Rubber Special" (see illustration below) home in the money.

The Voit racing team consists of four men: Mr. Foy; Lee Grismer, owner of the car and a former Voit sales supervisor; George Rowley, mechanic; and Bob Cook, pitman. Clad in jackets bearing the company's insignia, the team operates as a compact unit throughout each evening's racing schedule, keeping the midget car in top running condition for each event. Mr. Grismer is a veteran in auto racing and in 1914-18 was competing in the "cyclecars" which were the forerunners of the modern midgets. Mr. Foy has raced all types of cars in all parts of the country for over 17 years. Both Lee Grismer and Lou Foy are loud in their praise of Voit camelback which they claim has enabled them to win races while slashing tire costs.

Driver Lou Foy in the "Voit Rubber Special" Midget Racer Sponsored by W. J. Voit Rubber Corp.

EASTERN AND SOUTHERN

Report on Guayule

Intercontinental Rubber Co., Inc., 745 Fifth Ave., New York 22, N. Y., in its recent semi-annual report to stockholders revealed that during the first half this year company operations were seriously hampered by lack of guayule shrub for processing. The supply of wild shrub has been rapidly diminishing owing to excessive harvesting during the war emerency; consequently only small undersized and therefore expensive shrub is left. Furthermore the serious drought of the last two years so retarded the growth of young plants that the majority had to be left unharvested.

As a result, the shrub supply for the Mexican factories at Torreon and Catorce was inadequate for economical production. Besides the rubber agreement between the United States and Mexico, which sustained the 28¢ price, expired June 30, 1947, and a lower price for guayule prevails. Thus to avoid heavy operating losses Intercontinental in mid-June suspended operations at the Torreon and Catorce factories and left only the Cedros factory operating, which has a reasonably adequate supply of wild shrub tributary to it and which at 1941-42 rubber prices should be able to continue operating profitably. In late June, however, the New York spot price of plantation rubber, on which the price of guayule is based, dropped to a low of 13⅞¢ a pound. The company does not expect that prices will recover to a level where profitable operations would be possible for some time and therefore feels that it may become necessary to suspend operations also at the Cedros factory. Arrangements are now being made for this action.

The company further reports that about 1,100 metric tons of cultivated guayule were harvested this spring, and an additional 2,000 acres were planted, bringing the total area up to about 7,500 acres. Owing to the severe water shortage during the drought of 1945 and 1946 and only moderate rainfall so far this year, Intercontinental's cultivation program has had to be curtailed. The company plans no more planting for the time being.

The situation with regard to the Sumatra estate is still uncertain. A survey party has been organized to make an on-the-spot study of the property, and supplies and the needed transportation equipment have already been shipped preparatory to the visit to the estate when political conditions permit.

General Aniline & Film Corp., 230 Park Ave., New York 17, N. Y., at a meeting last month elected Cary R. Wagner vice president in charge of research and development. Dr. Wagner, who became a director last April, was also elected a member of the executive committee. He will direct the coordination of the company's extensive research and development activities in dyestuffs, photography, detergents, resins, and Ozalid sensitized materials, as well as fundamental research in related fields. For many years Dr. Wagner was research director of the Pure Oil Co., and, since leaving Pure Oil in 1942, he has served as consultant for major industrial companies in the petroleum and chemical fields. During the war he was in the Office of Petroleum Coordinator and has been long active in the Petroleum Division of the American Chemical Society.

Promoted by Pittsburgh Plate

E. Wayne Haley

Appointment of E. Wayne Haley as director of sales for the Southern Alkali Corp. was announced last month by W. I. Galliher, executive sales manager for the Columbia Chemical Division of Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22, Pa., and Southern Alkali, a subsidiary of the Pittsburgh firm. Associated with Southern Alkali since 1935, Mr. Haley has served as assistant director of sales during the past 12 years. As director of sales, Mr. Haley succeeds Eli Winkler, who will continue with the firm as sales consultant. As director of sales for the alkali firm, Mr. Haley will maintain headquarters at 30 Rockefeller Plaza, New York, N. Y.

Southern Alkali also maintains sales branches at Dallas, Houston, and Corpus Christi. Its plants are at Corpus Christi and Lake Charles, La.

Mr. Galliher stated that H. W. Gleichert, director of sales for Columbia Chemical, will continue in that capacity. His headquarters will remain at Fifth Ave. and Bellefield St., Pittsburgh, where executive sales offices of both Columbia Chemical and Southern Alkali are.

Robert L. Hutchinson

Appointment of Robert L. Hutchinson as general superintendent for Columbia Chemical and for Southern Alkali was also announced last month, by E. T. Asplundh, vice president in charge of the glass firm's chemical division. Mr. Hutchinson has served as superintendent of Columbia Chemical's huge alkali producing plant at Barberton, O., during the past seven years. He joined the firm in 1925 as a draftsman in the engineering department. Six years later he was placed in charge of all maintenance and construction, a position he held until his appointment as plant superintendent in 1940. Mr. Hutchinson's headquarters will be at the Columbia Chemical Division offices, Fifth Ave. and Bellefield St.

D'Alelio Joins Koppers

Koppers Co., Inc., chemical division, Pittsburgh 19, Pa., has opened an eastern sales district at 60 E. 42nd St., New York, N. Y., and a western sales district with its headquarters at 1426 Railroad Exchange Bldg., Chicago, Ill. The eastern district comprises all New England and the Middle Atlantic States, the eastern half of New York, and approximately the eastern one-third of Pennsylvania. The western district covers most of Michigan, all of Indiana, and all states due west of these two to the Rocky Mountains. Previously all sales of the Koppers chemical division has been handed the eastern assignment. Pittsburgh.

George D. Bieber, with the company since 1941, has been made western district sales manager; while R. C. Whitman, formerly eastern representative of Pennsylvania Coal Products Co., Koppers' subsidiary now a part of the chemical division, has been handed the eastern assignment.

The district managers will be responsible in their territories for sales of some 25 chemicals made by the division, chief of which are styrene monomer, polystyrene, resorcinol, and phthalic anhydride, and also for other plastics and special resins and adhesives made by the division.

G. F. D'Alelio, who at 38 has become one of the nation's most prolific developers of plastics and plastics materials, has become an assistant director of research for Koppers. A native of Charlestown, Mass., Dr. D'Alelio was graduated from Boston College in 1931. Four years later he received his Ph.D. from Johns Hopkins University and then returned to Boston College as an instructor in its graduate school. In late 1935 and during 1936 he was with General Electric Co., Pittsfield, Mass., as a staff chemist and later as director of all its plastics laboratories. He next became a vice president and director of research for the Prophylactic Brush Co., Northampton, Mass. Then early in 1946 he became manager of the high polymer research laboratory of Industrial Rayon Corp., Cleveland, O. He belongs to Phi Beta Kappa and several chemical and scientific societies, including the New York Academy of Science, the Chemical Society of London, the American Institute of Chemists, the American Chemical Society, and the National Chemurgic Council. Dr. D'Alelio received an individual citation from the Bureau of Naval Ordnance in recognition of his war research and development work. He is also the author of "Experimental Plastics and Synthetic Resins."

Changes at Raybestos-Manhattan

Raybestos-Manhattan, Inc., Passaic, N. J., recently announced the following appointments in its equipment sales division: Harry C. Dishman, equipment sales manager with headquarters in Detroit; George T. Young, branch manager of the Detroit office; E. E. Juergens, branch manager of the Cleveland office; and John E. Cole, branch manager of the Chicago office.

Mr. Dishman started with The Raybestos Co. in 1916 as development engineer and factory superintendent and was active in the development of molded brake lining and clutch facings. In 1919 he was appointed branch manager of the company's Detroit branch in charge of sales and engineering, and in January, 1932, branch manager of the Corporation Equipment Sales Division, Detroit branch. He is a member of the Society of Automotive Engineers.

Mr. Young, formerly with the Cadillac Motor Co., entered the sales department of The Manhattan Rubber Mfg. Co. in the Detroit office in June, 1917, selling mechanical rubber products as well as automotive friction materials and rubber products. He left for service in World War I in November, 1917, and rejoined Manhattan in May, 1919. With the formation of Raybestos-Manhattan, Inc., he continued in the equipment sales division of the corporation at the Detroit office.

Mr. Jergens, previous to joining the equipment sales division in January, 1934, as eastern representative, spent 22 years in various phases of the iron and steel industry. During the past two years he has covered western New York, western Pennsylvania, and Ohio, specializing mainly in friction materials for industrial equipment.

Mr. Cole joined Raybestos-Manhattan in 1939 with the industrial sales division at Cleveland. During World War II he served with the Cork, Asbestos & Fibrous Glass Division of War Production Board in Washington and became Acting Deputy Director. Shortly after returning from Washington he was made sales manager of the packing sales department of the Asbestos Textile & Packing Division at Manheim, Pa.

Woburn Chemical Corp. (N. J.), Harrison, N. J., has appointed Alan R. McFarland assistant to the vice president in charge of production. Mr. McFarland, a graduate of the United States Naval Academy (1938), most recently was personal aide to Fleet Admiral E. J. King. The company has also named as comptroller Charles H. Dugdale, formerly head of the cost department as assistant to the vice president in charge of operations. Mrs. Eleanor Delaney, in charge of the payroll department, has been promoted to the position of assistant comptroller.

Hercules Powder Co., Wilmington, Del., has made Harry E. Hartzell operating assistant for the cellulose products department at Wilmington. Mr. Hartzell, who has been with the company since 1926, formerly was cellulose acetate superintendent at the Parlin, N. J., plant.

Arthur A. Swanson, of the Parlin laboratory staff, has been named a plastics technical service representative; while Robert Wier, III, of the Hopewell, Va., plant, has been transferred to Wilmington to become an assistant product supervisor on CMC.

Lightbown Promoted

Irving E. Lightbown has been named manager of rubber sales of Enjay Co., Inc., marketers of chemicals made from petroleum, 26 Broadway, New York, N. Y., it was announced last month by the company, an affiliate of the Standard Oil Co. of New Jersey. Mr. Lightbown, formerly assistant manager of rubber sales has been with Enjay or other Standard Oil of New Jersey affiliates since 1937 and has been assistant manager of rubber sales since February 1, 1942.

Born in Fall River, Mass., he was graduated from Cornell University in 1931 with the degree of Bachelor of Chemistry. Before joining Esso Laboratories as a chemist in 1937, he worked for the B. F. Goodrich Co., Akron, O., and the General Cable Co. in Buffalo, N. Y. Mr. Lightbown is a member of the American Chemical Society and its Division of Rubber Chemistry, the Chemists' Club, New York, and the New York Rubber Group.

A resident of Westfield, N. J., Mr. Lightbown lives at 211 South Euclid Ave., with his wife and three children.

Dales in New Post

Adhesive Products Corp., 1660 Boone Ave., New York 60, N. Y., reports the completion of a new laboratory designed primarily for research toward improving the qualities of synthetic rubber products.

This laboratory will be under the direction of Benton Dales, formerly in charge of the neoprene latex laboratories of E. I. du Pont de Nemours & Co., Inc., with which he had been associated for the past 15 years.

M. P. Medwick, president of Adhesive Products, as a member of the CPA Rubber Technical Advisory Committee, was always of the opinion that synthetic rubber will eventually be far superior to natural rubber and will work with Dr. Dales to achieve this goal.

All types of synthetic rubber will be evaluated in the new laboratory, and work will also be done there to improve the qualities of natural rubber.

The Cambridge Rubber Co., manufacturer of rubber footwear, has decided to concentrate all manufacturing operations of the company in the United States in its Maryland and Pennsylvania factories and to liquidate the plant at Cambridge, Mass. The factory at Taneytown, Md., was erected only a few years ago and is considered one of the most modern rubber footwear plants in the country, equipped with highly advanced machinery and processes. The executive, financial, and merchandising offices in charge of all Maryland, Pennsylvania, and Canadian footwear factories of the company, remain at Cambridge, Mass.

Induction Heating Corp., manufacturer of Ther-monic induction and dielectric heating equipment, has moved to recently completed quarters at 181 Wythe Ave., Brooklyn 11, N. Y. The larger facilities, more than twice the size of the former plant, have been provided to take care of increased production activity and to accommodate expansion in the engineering, drafting, and jig and fixture departments.

National Toy Show

The first National Toy Show was held at the Hotel New Yorker, New York, N. Y., on August 17 to 20. The late date of the show made it an absolute deadline for Christmas buying. Despite the comparatively small size of the show, which covered three floors of the hotel, exhibitors found it highly successful.

Rubber products such as doll skins, dolls, balloons, bladders, footballs, baseballs, golf balls, volley balls, basket balls, and other rubber toys played a large part in the various displays. Exhibits of both natural and synthetic rubber were shown, but synthetic was used by most exhibitors in the manufacture of ball bladders. Some plastic items also were to be seen. Promises of supply in time for the Christmas rush invited brisk buying. Prices on the whole were firm as most products had taken their price drop earlier and were being sold only at legitimate profits.

Among the exhibitors were Dewey & Almy Chemical Co., Cambridge, Mass., represented by W. C. Robinson and H. A. Andrews Jr. and displaying play balls, balloons, doll skins, and bladders; Molded Latex Products Inc., Paterson, N. J., showing Kaysam latex toys and Joy balls, with E. L. Gregor, J. R. Stritch, and W. Charlop in attendance; and Tillotson Rubber Co., Inc., Needham Heights, Mass., represented by N. E. and J. G. Tillotson, W. J. Leatherow, and C. H. Traver and featuring play balls, balloons, bladders, and rubber toys. Other exhibitors who included rubber products were Bay Shore Industries, Elkton, Md.; Ideal Novelty & Toy Co., Long Island City, N. Y.; Junior-Pro Products Co., St. Louis, Mo.; Lewco Products Co., Inc., New York; Mayfair Sporting Goods Co., Egg Harbor City, N. J.; Nielsen Bros. Sports Sales Inc., Brooklyn, N. Y.; Plastic Inovations, Inc., New York; and Plastic Playthings, White Plains, N. Y.

This new toy show, which was devoted to manufacturers and manufacturers representatives and which was held to stimulate Christmas buying which was slow at the beginning of the year, is here to stay, according to E. A. Richardson, managing director of the exhibition. Created at the express wishes of the exhibitors, it is expected that the show will be held earlier next year, possibly in February.

The Georgia Marble Co., Tate, Ga., has appointed John W. Dent vice president and general manager of the calcium products division. He was formerly with Thompson-Weinman Co., Cartersville, Ga., as production manager of all its plants located throughout the country, which included a similar position with the Paga Mining Co., also of Cartersville.

Under Mr. Dent's direction the calcium products division will expand its crushing operations and will start immediate construction of additional plants to produce wet ground calcium carbonate pigment of high grade for the paint, rubber, and paper trades.

William B. Tate, Jr., formerly with the engineering department of Georgia Marble, has been made sales manager of the calcium products division.

Columbian Carbon Co., 41 E. 42nd St., New York, N. Y., has purchased for cash the 50% stock interest held by Phillips Petroleum Co. in Columbian-Phillips Co.

Ching Resigns; Other U. S. Rubber Developments

Cyrus S. Ching is retiring from United States Rubber Co., Rockefeller Center, New York 20, N. Y. to accept an appointment by President Truman as director of the new independent Federal Mediation & Conciliation Service created by the Taft-Hartley Act. Mr. Ching has been with U. S. Rubber for more than 28 years and since 1929 has been director of industrial and public relations. A native of Canada, Mr. Ching came to the United States in 1900 and received a law degree from Northeastern University in Boston. He joined the rubber company in 1919 as supervisor of industrial relations. At various times he has been called to Washington to advise the government on labor problems. In 1941 he served on the National Defense Mediation Board. At the start of World War II he was appointed chairman of the committee to convert the automobile industry to war work, and in 1942 he was appointed a member of the War Labor Board, a post he held until September, 1943.

Cyrus S. Ching

Appointment of Robert D. Stuart as sales promotion manager of the general products division was announced last month. Mr. Stuart was graduated in 1941 from Wesleyan University and while in college was active in radio work. He was also one of the founders of the Intercollegiate Broadcasting System, an announcer for WDRC, and assistant program manager of the station's FM facilities. Mr. Stuart served in the Armed Forces from 1942 until February, 1946. Then he spent some time as free-lance writer and as producer for the Mutual Broadcasting System. He became associated with U. S. Rubber in January, 1947, as an assistant to the advertising director. In his new position he will supervise advertising and sales promotion for a variety of rubber products, including heels and soles, druggists' sundries, golf balls, bathing and beach wear, household specialties, industrial rubber gloves and aprons, and industrial sponge rubber.

The company has appointed Donald Carroll manager of its tire cord plant in Scottsville, Va. and its Seaboard-Stevens plants in Burlington, N. C. Mr. Carroll has been superintendent of the Scottsville plant since the beginning of this year and previously had been assistant to the technical director of the company's textile division, with headquarters in New York. He has been associated with the company since 1933, when he started as a laboratory technician in Shelbyville, Tenn.; he later became technical supervisor at Hogansville, Ga., and Winnsboro, S. C.

Key members of Mr. Carroll's staff will include Stephen A. Ward, assistant to the manager at Scottsville; R. M. Mitchell, Jr., assistant to the manager at Burlington, and F. C. Phillips, superintendent of the Seaboard-Stevens plants.

The latter plants were acquired by U. S. Rubber this year to provide additional facilities for the production of several new products, including glass-asbestos decorative fabrics, plastic textiles, and Strex, a stretchable fabric for surgical bandages, wearing apparel, and other applications.

The Scottsville plant produces rayon tire cord.

In a move designed to strengthen the position of its tire dealers in the field with respect to sales of batteries and auto accessories, the rubber company's tire division has formed a new department to coordinate all activities involving these and allied commodities, according to Howard N. Hawkes, assistant general manager of the tire division. The department will be known as the allied products department, with Foster M. Stewart, formerly in charge of distribution planning for the tire division, as manager. Mr. Stewart will be assisted by the following department managers: F. W. Lewis, manager, auto accessories; I. S. Johnson, manager, batteries and ignition products; C. E. Marshall, manager, controls.

A. G. Westlund has been appointed manager, sales production coordination department of the company's tire division, it was announced last month by J. W. McGovern, vice president and general manager of the division. In his new capacity Mr. Westlund will coordinate the production of the company's tire factories with sales and inventory requirements based on original equipment and replacement needs for all types of tires. A native of Alexandria, Minn., Mr. Westlund came with the company in 1919 as bookkeeper at the Minneapolis branch. He was transferred to Sioux City, Iowa, as chief clerk in 1920; and in 1926 went to Omaha as district credit manager; became district credit manager at the Minneapolis branch in 1929, and in 1939 treasurer of the Gillette tire plant at Eau Claire, Wis. He was transferred to New York as assistant sales manager of the Gillette and G & J tire division in 1940 and in 1941 was made district manager at Chicago for the Gillette tire division. Mr. Westlund returned to New York in 1946 as manager of business development activities for the U. S. Tires division, the position he held leading to his current appointment.

Emphasizing the importance of the farm market, J. C. Ray, sales manager for U. S. Royal tires, last month announced the formation of a new department to handle this activity. This department will formulate plans for U. S. tire distributers on all types of tires and accessories adapted to the needs of farming areas, including farm tractor, truck, and passenger tires, as well as batteries and other items and services.

Lawler B. Reeves has been appointed manager of farm market sales. A native of Wapanucka, Okla., Mr. Reeves came to U. S. Rubber in 1941 as a salesman at Oklahoma City. He obtained a leave of absence from the company during the war to join the Army Air Force. Upon his return to the company at the close of the war, Mr. Reeves was placed in charge of aircraft tire sales. In his new capacity he will have headquarters at the company's main offices in Rockefeller Center.

Fisk Tires division has announced the following changes in its personnel, according to H. M. Ramsay, Fisk sales manager:

C. J. Morgan, formerly New York district sales manager, has been named assistant sales manager for the Fisk division, succeeding A. M. Guy, now district manager at Detroit, replacing R. C. Moore, resigned. In his new capacity Mr. Morgan will spend much of his time in the field assisting district sales personnel.

Also, P. F. Lee has been made administrative assistant to Mr. Ramsay, with headquarters in New York.

J. W. Green, formerly distribution development manager, has been appointed assistant district manager at Chicago.

J. W. Timmons, formerly farm tire manager, has been named assistant district manager at Kansas City.

J. L. Dunleavy, formerly manager of tire and tube department, has been appointed assistant district manager at the New York branch, replacing P. C. Ramsdell, now merchandising manager at general office headquarters.

R. L. Eichenlaub becomes manager, truck tire merchandising.

W. L. Barbon, formerly Fisk tires district manager at Chicago, has rejoined the company as district manager at Baltimore. A native of Princess Anne, Md., Mr. Barbon is a graduate of the University of Maryland, who later took post-graduate work at Johns Hopkins. He started with the rubber company as an accountant in the Baltimore office 22 years ago; next he became credit manager, at Philadelphia. In 1937 he went to Atlanta as sales analyst for the company, remaining there six years; then he was appointed district manager at Chicago, a post he held four years.

A new cable that will not spark when short circuited has been developed by electrical engineers to aid in the prevention of coal mine explosions. The cable features a fine strand of copper wire embedded between inner and outer layers of insulation. In the event of damage to the insulation, the fine wire catches incipient current leakage before an arc can occur and carries it to a sensitive circuit breaker which cuts off the power. The cable was developed jointly by engineers of U. S. Rubber and Leonard Wilson, of Kenilworth Mines, Utah. The cable is used to carry power to heavy equipment employed in digging and transporting coal. Because it trails on the ground, the cable is in constant danger of being damaged and short circuiting.

U. S. Rubber televised the semi-finals and finals of the Eastern grass court tennis championships direct from the Orange Lawn Tennis Club, South Orange, N. J., on August 9 and 10. The matches were carried over WABD-Dumont in New York and WTTG in Washington, D. C. In televising the matches, a new type of image orthicon camera which produces greatly improved pictures and provides better photo coverage was used for the first time. The new camera has four lenses mounted in a turret which enable the operator to change instantly from overall shots to quick close-ups without loss of picture sequence.

M. Pancorbo, manufacturer of the Span grinding mill, is now located at 21 S. 12th St., Philadelphia 7, Pa.

Foster D. Snell, Inc., firm of consulting chemists and engineers, 29 W. 15th St., New York 11, N. Y., has announced that John R. Skeen has joined its staff as account executive in charge of market research. Since 1945 he was principal chemical engineer in the Business & Industries Division of the Bureau of Internal Revenue's Income Tax Unit, where he acted as consultant to the field divisions in the examination of claims of chemical companies for relief from excess profit taxes. Dr. Skeen, who heads the greatly expanded market research activities of Foster D. Snell, Inc., is an alumnus of The Pennsylvania State College and of the University of Pennsylvania, from which he received the degree of Ph.D. in 1926. Following teaching assignments at the University of Pennsylvania and La Salle College, Dr. Skeen joined the research staff of United Gas Improvement Co., Philadelphia, in 1930 and continued with that organization in various capacities until 1943. In 1942, on leave of absence from U. G. I., he became acting chief of the Chemical Branch, Office of Civilian Supply, Washington. Dr. Skeen is a member of Theta Chi, Sigma Xi, American Chemical Society, American Association for the Advancement of Science, American Society of Plant Physiologists, Botanical Society of America, and the Pennsylvania Academy of Sciences.

Controllers Institute of America, 1 E. 42nd St., New York 17, N. Y., has announced the reelection of Arthur Surkamp, treasurer of United States Rubber Co., as a director of the Institute's New York City Control. J. M. Stonnel, controller of Copolymer Corp., Baton Rouge, La., has been elected president of the New Orleans Control; while Wm. H. Watkins, controller and assistant treasurer of Hewitt-Robins, Inc., Buffalo, N. Y., has been chosen vice president of the Buffalo Control. Frederick L. Patton, assistant to the president of Cambridge Rubber Co., Cambridge, Mass., is the new secretary of the Boston Control.

Moore & Munger, 33 Rector St., New York 6, N. Y., has changed the name of its clay department to P. W. Martin Gordon Clays, Inc., at the same address. The personnel of the organization has not been changed. As in the past, E. W. Schwartz and W. H. Shields are technical sales representatives for Buca, Catalpo, Pigment 33, Whitetex, and Synthetic 100.

Hewitt-Robins, Inc., Buffalo 5, N. Y., has appointed I. H. Welch sales representative covering the central Iowa territory, with headquarters in Des Moines. He will handle the entire Hewitt Rubber line of hose, belting, and molded rubber goods as well as the complete Robins Conveyors line of materials handling equipment. Mr. Welch, an engineering graduate of the University of Wisconsin, has had many years' experience in this field.

Pioneer Latex & Chemical Co., Inc., Lincoln Blvd., Middlesex, N. J., according to President Steve Paliska, has appointed Edward H. Robbins director of research, in line with the company's expansion program in the automotive, adhesives, impregnating, carpet and plush backing and combining fields. Mr. Robbins had previously been chief chemist of Atlas Latex & Chemical Co., Delawanna, N. J., and before that, research chemist at Flintkote Co., East Rutherford, N. J.

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Stivas Studio

Lynn Harbison

Heads Philblack Laboratory

Frank Andrews, manager carbon black division, chemical products department of Phillips Petroleum Co., has announced the appointment of Lynn Harbison as manager of the company's Philblack sales service laboratory, Akron. Mr. Harbison brings to this laboratory 21 years of broad experience in the rubber industry. Following his work in the mechanical goods division of The B. F. Goodrich Co., he spent two years in Europe modernizing a rubber plant and further supplemented his experience in this field by work in the mechanical goods division of the United States Rubber Co., Passaic, N. J. For the past five years Mr. Harbison was employed as a development chemist in the tire division of Firestone Tire & Rubber Co. He was graduated with honors from the University of Missouri where he obtained both Bachelor of Science and Chemical Engineering degrees.

B. H. MacLeod

Report on Research at Kent U.

Recent lifting of censorship has revealed that students at Kent State University, Kent, aided in vital research on synthetic rubbers. GR-S-10 was produced after experiments at Kent proved it could be manufactured in large quantities. In closing the Goodrich laboratory at the university recently, E. A. Willson, the resident supervisor said that the setup was unique in the history of education and rubber research, since university students were chosen to perform systematic experiments in the development of synthetic rubbers under the supervision of industrial research men.

At the start of the wartime rubber program, laboratories were set up at several universities, but only at Kent State did a rubber company move in bodily, take over the facilities, and operate them using students on a part-time basis for help. In May, 1943, Waldo L. Semon, then director of synthetic rubber research for Goodrich, took over the top floor of the university's science building and set to work with a staff of six technical men and four assistants. H. L. Trumbull followed Dr. Semon as director of synthetic rubber research. Only two of the industrial research men were held on the project from the start until the end, June 30, 1947. They were John Yanko and R. J. Houston. Some 30 students, all either undergraduate or graduate chemistry majors, helped with the research.

From the company's standpoint the staff at Kent State had quiet, uninterrupted working conditions, with a minimum of outside contact. However a special supply system between the university and the company's Akron plants 12 miles away had to be set up. In addition, housing for technicians and their families presented a problem. Although progress was delayed at times because the laboratory program had to be adjusted to fit the work schedules of the students, the program did furnish workers who otherwise could not have been had except by release from the Armed Forces.

The Oak Rubber Co., Ravenna, recently honored upon his completion of a quarter-century of service, James Macnaughtan, Jr., popular sales representative.

The Firestone Tire & Rubber Co., Akron, recently honored J. J. Shea, vice president and treasurer, upon the completion of four decades with the company.

Gro-Cord Rubber Co., Lima, has signed B. H. MacLeod as general sales manager, according to Kyle Menez, company manager. Virgil M. Knisely is now in charge of the replacement sales division. Mr. MacLeod comes to Gro-Cord from the Brown Shoe Co., and previously had been with the Avon Sole Co. for ten years, and, earlier, with the Alfred Hale Rubber Co. His experience has been in manufacturing and sales. He is a native of New England and is also an engineering graduate of Massachusetts Institute of Technology.

Expansion into the replacement trade and general rearrangement of the sales department brings Mr. Knisely into his position in charge of replacement sales, which will be handled through a combination of distributers, agents, and direct jobber sales, varying with the territory covered.

Goodyear's Expansion Plans; Changes in Personnel; New Tire Announced

A sprawling war plant on the outskirts of Akron, which turned out thousands of surfaces for Army fighter and bomber planes, soon will be placed in peacetime production by The Goodyear Tire & Rubber Co. The company will expand its production facilities of Pliofilm, a transparent, moisture-proof food packaging material, and Airfoam, a foamed latex product for furniture, commercial seating, and mattresses.

Operated during the war by Goodyear Aircraft Corp. and purchased recently from the War Assets Administration by the parent Goodyear company, the main structure and 12 affiliated buildings embrace 864,000 square feet of floor space and are spread over 35.8 acres of ground.

P. W. Litchfield, Goodyear board chairman, said the building will be known as the special products manufacturing division and will be equipped with the very latest type of continuous production equipment to handle the greatly increased post war demands for these two Goodyear products. More than $9,000,000 will be spent by the company, Mr. Litchfield said, in placing the plant in its peacetime operation. Of that amount, $2,200,000 was paid the federal government for the aircraft structure, now being used for storage purposes by the WAA. The federal agency will use a portion of the floor space for a year, he added.

Production is expected to start early in 1948 with some 1,200 persons employed in the new activities, Mr. Litchfield stated. Output of both Pliofilm and Airfoam will supplement that being turned out on existing facilities at Akron and other company plants.

Expansion of Pliofilm facilities, he explained, is the company's answer to the steadily increasing demands for this material in the packaging of fresh and frozen fruits, vegetables, meats, seafoods, and kindred items.

The additional Airfoam equipment will supply slab and molded stock for automobile, bus, truck, airplane, theater, and stadium seating as well as furniture and mattress fabricators. This foamed latex material, he said, has untold possibilities in the furniture field where it offers luxurious cushioning qualities and is extremely sanitary.

The company's decision to locate its expanded Pliofilm and Airfoam facilities at the one-time aircraft plant centralizes production activities for the chemical products division of the company. A section of another plant, purchased last year from the WAA, now houses preliminary operations on Goodyear's newest product, a vinyl material.

Further extension of a general modernization program to include a $500,000 steam generating and water treating plant that will replace or supplement obsolete equipment was announced last week by The Goodyear Tire & Rubber Co. of Michigan, at Jackson. Work is already under way on the foundation of a new $100,000 building that will house two virtually new boilers capable of increasing the plant's steam capacity 70%. In announcing the new program, Plant Manager E. T. Ruffner said increased steam output has been necessitated by new-type vulcanizers now operating at the plant.

The new building will be 80 by 90 feet and 72 feet high. A total of 7,200 feet of floor space will be provided for the new equipment. The entire project is scheduled for completion next spring although it is expected that one of the boiler units will be in operation shortly after the first of the year.

One of the major improvements being embodied in the modernization plan is a $25,000 fly ash eliminator which works on the same principle as a cream separator in discharging ash into a collecting bin and permitting only gases to emit from the stacks. The new system will eliminate all dirt normally transmitted into the air. An improved ash handling arrangement is included in the program along with replacements and improvements in the water softening system.

The new-type boilers, major item in the development, were purchased from WAA. Each boiler is capable of producing 100,000 pounds of steam per hour. The boilers were formerly in use at the Chickasaw Ordnance plant in Millington, Tenn., which produced smokeless powder and TNT during the war. The boilers operate automatically from a centralized control panel.

Transfer of Personnel

Leland E. Spencer, manager of Goodyear's Topeka, Kans., tire factory, has been loaned to the War Department for a year on a leave of absence basis to assist Gen. Lucius D. Clay in the economic rehabilitation of Germany. Request for the services of Mr. Spencer and several others from American industry and business, including American Telephone & Telegraph Co., Weirton Steel Co., Inc., and Sears, Roebuck & Co., came from Secretary of War Robert P. Patterson, who recently sent 13 industrial and business executives to Germany on a rehabilitation survey. This group returned convinced that General Clay needed experienced assistants for the successful operation of the program.

Mr. Spencer, a member of the Goodyear organization for the past 21 years, started with the company in its Akron plant, serving in production control, statistics and forecasting departments until 1939, when he was made manager of merchandise planning.. He was appointed manager of the Topeka plant in 1945, following a three-year tour of duty during the war with the government in Washington, which included the post of deputy director of the Rubber Division of the War Production Board.

Walter H. Rudder succeeds Mr. Spencer at Topeka. Previously Mr. Rudder was production superintendent of the company's Gadsden, Ala., plant, to which he was assigned in January, 1946, following a wartime post as manager of the Goodyear Lincoln, Neb., factory which began production of fuel cells in 1943. Mr. Rudder had engineered military fuel cells for the company at Gadsden in 1942. Before that, he was on chemical compounding at the Gadsden factory, where he started in 1929 as an analytical chemist, following graduation in 1928 from Alabama Polytechnic Institute.

Claude E. Davis has been made field engineer in the Midwest for Goodyear. This is a new post in the field organization, and Mr. Davis will supplement the work of company engineers in Akron, aiding mechanical goods field representatives in obtaining technical on-the-job data and supervising the installation of conveyer belts in mines and other operations. His headquarters will be in St. Louis. Native of Livingston, Wis., Mr. Davis is a graduate of the University of Missouri School of Mines, and he also studied at the Wisconsin Mining School. He joined Goodyear's mechanical goods division in Akron in 1943. A veteran of World War II, Mr. Davis spent a year in Japan after the war making a survey of coal mines for the natural resources section of the Army.

R. W. Fitzgerald, until recently western division manager for Goodyear, with headquarters in Los Angeles, Calif., has been transferred to a new post as manager of the company's north central division at Chicago, Ill., and he has been succeeded at Los Angeles by C. W. Thorp. Mr. Thorp, whose former post was district manager at Los Angeles, has been succeeded by S. J. Plunkett, transferred from the company's Cleveland offices.

George F. Griffith has been appointed store supervisor for Goodyear's Pittsburgh district. Joining the company in August, 1934, as a ledger clerk in the Albany district, Mr. Griffith was transferred to inside sales there two years later. In March, 1937, he was made office manager at the store in Troy, N. Y., and commercial salesman there in May, 1938. He was promoted to field representative, Albany district, in September, 1940, going to Poughkeepsie as store manager in April, 1942. He served as merchandising school instructor in Akron previous to his present appointment.

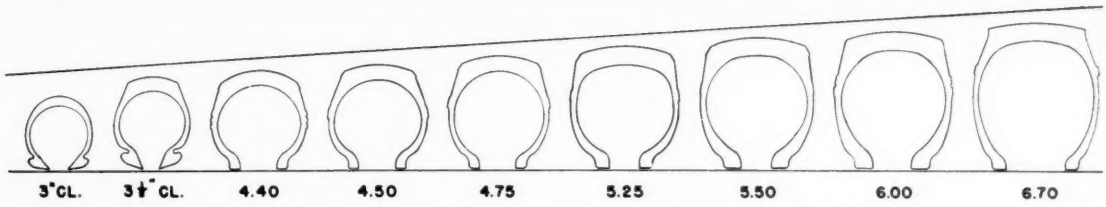
Three shifts in the sales organization of the mechanical goods division were announced by H. D. Foster, division manager. R. E. Pauley, district manager at Pittsburgh, becomes sales manager of the company's molded goods plant at St. Marys. He is succeeded by Robert B. Warren, formerly eastern railroad sales manager for Goodyear in New York, N. Y. Howard T. Martin has been named district manager of mechanical goods sales at Dallas, Tex.

Mr. Pauley, native of Valparaiso, Ind., joined Goodyear in 1935 after graduating from Purdue University. He held sales posts in Akron, Cleveland, Chicago, and Dallas before going to Pittsburgh. In 1943 he won the P. W. Litchfield award as the company's outstanding mechanical goods salesman. Mr. Pauley succeeds Samuel DuPree, whose appointment as an assistant manager of Goodyear's mechanical goods division, with headquarters in Akron, was announced recently.

Born in Hillsboro, O., Mr. Warren entered Goodyear's employ in Akron in 1927 after graduating from Ohio Wesleyan University. In 1933 he became mechanical goods representative in Atlanta, then transferred to New York in 1938. He served as assistant head of the Navy rubber director's office from 1942 to 1945, holding the rank of lieutenant-commander. The Pittsburgh sales district to be headed by Mr. Warren embraces western Pennsylvania and upper New York State.

Mr. Martin came to Goodyear in 1926, and his entire service has been in Texas. He has been field representative at Dallas for several years. His district managership includes Texas, Oklahoma, Mississippi, Louisiana, and parts of Kansas, Arkansas, and New Mexico. Mr. Martin succeeds O. A. Schilling, whose appointment as eastern sales manager of Goodyear mechanical goods with headquarters in Akron, was also announced recently.

E. W. Sanders, sales manager of Goodyear's rubber-to-metal products, resigned September 1 to become vice president and sales manager of The Wilsolite Corp., Buffalo, N. Y., distributer of Goodyear rubber printing products and industrial me-



FORD	TO 1921	TO 1924	1925-27	1928-29	1930-31	1932	1933-34	1935-46	
CHEVROLET	TO 1916	1917-25	1926-27	1928-29	1930-31	1932-33	1934, 35, 36	1937-46	
PLYMOUTH					1929-31	1932-33		1934-46	
NASH						1932	1933-34	1935-46	
HUDSON						1932-33	1934	1934-46	
OUTSIDE DIAMETER	30.4	31.7	30.4	30.7	29.5	29.2	29.0	28.5	29.2
SECTION WIDTH	3.2	3.9	4.3	4.7	4.9	5.3	5.7	6.2	6.70
TIRE WEIGHT LBS.	9.8	14.5	15.5	17.6	18.3	19.5	20.9	22.9	23.55 (c)
AVERAGE TIRE LOAD	400	600	690	875	885	995	985	925	915
INFLATION PRESSURE	50	50	32	35	35	35	32	28	24

Fig. 1. Evolution of Passenger-Car Sizes of Tires Used on Light Cars

chanical goods. Native of Cleveland and a mechanical engineering graduate of the University of Michigan, Mr. Sanders joined Goodyear in 1928 and organized the company's printer supplies department in 1936.

E. R. Coate has been appointed acting manager of Goodyear's printer supplies sales. He has been with the company since 1936.

In the two other departments headed by Mr. Sanders, Ernest Peterson will continue as manager of industrial roll sales, and R. W. Eckstein will continue as manager of tank lining sales.

Robert R. Boyle has been named division superintendent of Goodyear's tire plant in Buitenzorg, Java, it was announced last month by George K. Hinshaw, vice president and production manager of Goodyear foreign operations. Native of Pittsburgh, Mr. Boyle joined Goodyear in Akron in 1933, starting on the production training squadron. During the war he was associated with Goodyear Aircraft Corp., returning in 1945 to Goodyear Tire as a tire division foreman.

Goodyear regained possession of its Java factory several months ago after losing it early in 1942 to the invading Japanese. The plant has been rehabilitated and is in production, but has not yet reached its prewar daily output of 900 auto tires and tubes and 8,000 cycle tires and tubes, Mr. Hinshaw said. He further revealed that the current Dutch-Indonesian conflict has not disrupted factory operations.

Larry H. Coffin has returned to Akron as assistant to Mr. Hinshaw. Mr Coffin has been plant manager of the company's tire, textile, and mechanical goods operations in Sao Paulo, Brazil, since 1942. Native of Boston, Mass., Mr. Coffin joined Goodyear in 1927 after graduating from Massachusetts Institute of Technology. His first overseas assignment was in 1930 as technical service manager at the company's plant in Hurlingham, Argentina. In 1939 he transferred to Brazil as development manager becoming plant manager three years later.

Marvin A. Ryan, in charge of Goodyear's Cuba plant, succeeds Mr. Coffin as plant manager in Brazil.

Three other Goodyear men who hold foreign posts are in Akron on regular home leaves. They are: M. S. Meyer, since 1944 managing director of Goodyear operations in India; W. J. Condon, plant manager at Sydney, Australia, who has spent 20 years overseas for the company, and Reardon West, production superintendent of tires at the Goodyear-Argentina factory.

Table 1. Comparison of Present Tires with Super Cushion Tires

	Size	Rim Width, In.	Recommended Load, Lbs.	Inflated Width, In.	Inflation Pressure, Lbs.	Inflated Overall Diameter, In.	Rolling Radius, In.
Present Tire	5.50-16	3.50	810	5.65	30	27.42	13.05
Super Cushion	6.40-15	4.50	865	6.40	26	27.20	12.91
Present Tire	6.00-16	4.00	915	6.25	28	28.38	13.37
Super Cushion	6.70-15	4.50	915	6.70	24	28.16	13.30
Present Tire	6.25-16	4.25	985	6.50	28	28.95	13.67
Super Cushion	7.10-15	5.00	985	7.10	24	28.82	13.61
Present Tire	6.50-15	4.50	1005	6.80	28	28.1	13.20
Super Cushion	7.60-15	5.50	1080	7.60	24	29.27	13.79
Present Tire	7.00-15	5.00	1095	7.35	26	29.05	13.60
Super Cushion	8.20-15	6.00	1225	8.20	24	30.31	14.23
Present Tire	7.50-15	5.50	1500	8.00	36	30.3	14.35
Super Cushion	8.90-15	6.50	1420	8.90	24	31.3	14.8

Return of garden hose to the line of Goodyear's mechanical goods has been announced by R. W. Sanborn, manager hose sales. Production of three brands is now under way, and the hose will be back on the market next year, Mr. Sanborn added. Goodyear garden hose was not made during the war owing to restrictions on the use of premium-quality materials.

Featuring a body structure of high tensile strength rayon and a corrugated cover, the line consists of Wingfoot, Pathfinder, and Glide brands. Colors are brown, green, and black. In redesigning and restyling the line, the company paid special attention to developing a garden hose with extreme flexibility and lightness. Goodyear is also reinstating its heavy-duty Emerald Cord hose, designed for specialized service at golf courses, public parks, large estates, and similar uses. This brand also features a rayon carcass and has a new rounded-rib cover for the purpose of preventing injury to golf greens

New Automobile Tires

Goodyear has begun production of a complete new line of Super Cushion automobile tires, it was announced by P. W. Litchfield, chairman of the board. The new tires are designed for use on wider base rims than those in common current usage. The tires require 14% less air pressure and are relatively lighter in comparison to their size than conventional tires. Design characteristics engineered into the new Super Cushion tires are stated to improve car performance by reducing vibration and smoothing out irregularities in streets and roads.

A review of the evolution of passenger-car tires for the past 30 years shows a definite trend. Figure 1 shows the evolution of tire sizes, load carrying capacities, dimensions, and inflation pressures for the low-priced cars since about 1915. The same trend has been followed in the larger, higher-priced cars. It can be seen that tire sections have increased steadily in size while inflation pressures have decreased; overall diameters have changed but slightly; tire weights have increased slowly; tire mileage has increased; and tire cost per mile has decreased. In addition, tire rim diameters have decreased while rim widths have increased.

During this period of evolution Goodyear has consistently promoted larger, softer tires, culminating in the development of the Super Cushion. A comparison of the Super Cushion tire in various sizes with the corresponding sizes of conventional tires is given in Table 1. A review of the data presented shows the new tire to have a 24-pound recommended air pressure, as against 28 pounds for conventional tires. The Super Cushion has a wider rim, about 4% to 6% wider than the average rim in use today. The rim diameter of the new tire is 15 inches for all sizes, and the tread is slightly narrower than ordinary tire treads.

Goodyear reports that results of extensive and exhaustive road tests have shown the Super Cushion tire to have the following advantages: (1) a much better ride at four pounds less air pressure, with better absorption of shocks, less mechanical maintenance, and less driver fatigue, while the tire is cooler running and has less pressure

build-up; (2) a car which handles easier and safer at all speeds and on all kinds of roads; (3) longer tire carcass life because it is cooler running and has less bruising and cutting; (4) longer, smoother wear than conventional tires; (5) less road noise; 6) better traction because of its slotted tread and lower pressures; (7) better appearance because of its larger size; (8) its name size reflects the full tire size on a recommended rim; (9) its increased cost is low compared to the advantages it offers; (10) lower ultimate cost to consumers because of its lower mechanical upkeep; and (11) all these advantages with tire mileage equal to or better than the best first-line conventional tires.

The Super Cushion tire can be adapted to most current model cars, for experimental purposes at least, by simply changing wheels. There may be some minor alterations and adjustments desirable or necessary to adopt the tire as standard equipment on new model cars. The company believes that the Super Cushion-type tire will be the new car tire of the future, starting perhaps with the 1948 model cars, if not sooner.

Holds Research Panel

A new synthetic rubber,[1] recently revealed by William O'Neil, president of The General Tire & Rubber Co., Akron, was one of the main topics for discussion at a recent company research panel headed by Gil Swart, General's chief research chemist. The research experts, including professors from colleges with which General has a research arrangement and representatives from many General Tire plants, outlined plans for the new rubber that comes much closer to matching all the advantages of natural rubber than anything now available. It has chlorinated styrene as its basic ingredient.

News of the proposed uses for this rubber will be released soon.

Among those attending the panel were: Charles M. Saffer, Mr. O'Neil, Henry B. Hass, G. Bryant Bachman, Miss Lois Broch, Guido H. Stempel, Jr., Henry Feuer, Arthur A. Harban, Dean Lowrey, C. T. Bahner, H. Shechter, Ralph Kaplan, Robert Santelli, Roy Sugimoto, and J. E. Ablard.

[1] See India Rubber World, Aug., 1947, p. 649.

The Mansfield Tire & Rubber Co., Mansfield, will have a 600-foot square exhibit at the annual Automotive Service Industries Show to be held at the Navy Pier, Chicago, Ill., December 8-13. The company will display Century, Richland, Mansfield, and United tires in the largest exhibit the company has ever had at the Show in its eight years of attendance. Purpose of the Show is to afford jobbers and manufacturers of automotive products opportunity to discuss marketing programs, to see the latest advancement in products, and to discuss the future outlook for them.

Ottawa Rubber Co., 212 Main St., Toledo 1, which started operations on special mechanical products on October 1, 1945, is increasing its manufacturing space because of the growth of business, according to C. L. Bugert, president and treasurer. The concern recently leased a 5,500 square foot, one floor cement block building on a 2½-acre plot along the railroad at Bradner, O., about 25 miles south of Toledo. This building is now being set up for manufacturing purposes without interruption of operations at Toledo. When facilities at the new site are completed for manufacturing Ottawa's full line of products, the company plans to use the present location in Toledo for store, warehouse, and sales purposes for an indefinite period. The administrative offices also will be retained in Toledo for an undetermined time.

J. K. McElligott

McElligott Joins Schulman

Alex Schulman, president of A. Schulman, Inc., Akron, has announced the addition of J. K. McElligott to his executive staff. Well known in the scrap rubber industry, Mr. McElligott was formerly vice-president of The Loewenthal Co., Chicago, Ill. He joins A. Schulman, Inc., in a sales executive capacity.

Personnel Changes at Goodrich

Ralph D. Au has been appointed manager of the rubber purchasing department of The B. F. Goodrich Co., Akron. Mr. Au has been with the company since 1933 after having received a science degree from Wooster College. He spent several years in the chemical laboratories and raw materials division in Akron before being sent to New York in 1938 to open the New York office of crude rubber inspection. In 1942 he was loaned to the Rubber Reserve Co. as assistant chief inspector of crude rubber. He again headed the Goodrich New York office of rubber inspection from 1943 until his appointment to the purchasing department on July 1, 1947.

Two appointments in the truck and bus tire sales department were recently announced by Joseph E. Powers, department manager.

Howard F. Kidwell will be in charge of fleet sales, including national account sales and state business. He has been with the company since 1929, in retail tire sales until 1942, when he joined the automotive, aviation and government sales divisions in the Detroit district.

Thomas I. Jenkins will be in charge of industrial tire sales. With Goodrich since 1925, he had previously handled industrial tire sales for the automotive, aviation and government sales division.

Howard F. Miller has been appointed general supervisor in the San Francisco district of Goodrich's replacement tire sales division. He goes to California from Akron, where he had been manager of petroleum company sales for the last two years. He has been with the company since 1928, starting as a salesman in Indianapolis, and has held a number of sales posts, including managership of several of the company's retail stores.

Robert A. Mansfield will be in charge of customer service and product development, and Joseph A. Devlin will be purchasing agent for the company's plastics division plant in Marietta, O., which is starting operations, it was recently announced by Factory Manager Bert S. Taylor. Mr. Mansfield, a Harvard graduate in chemistry, took post-graduate work in business administration at Boston University. He has been with Goodrich since 1940 and has held several assignments in technical work as well as in production, having been general foreman of the plastics spreading department during the war.

Mr. Devlin was graduated from the Philadelphia Textile Institute in 1933 and entered the textile selling field. At the start of the war, he joined the OPA staff as a textile consultant and later came to Goodrich as a buyer of cotton and rayon goods.

Lee Plageman has been named auditor for the new plastics plant which Goodrich will operate in Marietta. Mr. Plageman started with the company as a cost clerk on June 16, 1927. He later became a cost accountant and has spent most of his career in that phase of the company's business.

Adolph H. Thye has been made staff manager of the new Goodrich plastics division in Marietta. Mr. Thye, with the company since 1924, had been staff manager in the reclaimed rubber division and later in the plastics division in the Akron plant, since 1939.

V. F. Wigel will be in charge of the chemical laboratory in the new plastics division at Marietta. Mr. Wigal, a graduate in chemistry from West Virginia University, has been with the company since 1939, principally in its processing division.

P. D. Wagner recently left Akron for his new position as secretary of Goodrich Rubber SS, Ltd., Singapore, China. He was accompanied by his wife and two children.

Raymond J. Hull, a former production manager in the tire division, has been named factory manager of the new tire plant being completed in the Netherlands. He will leave for his new assignment about September 27. Accompanying him will be two other Goodrich tire men; Marion Pierce, who will be in charge of tire construction in the Goodrich associated plant; and Orrville Dahl, who will be in charge of tire compounding.

Karl Draves, recently transferred to Akron from the company's plant at Oaks, Pa., will soon leave for Columbia, where he will be one of Goodrich's technical representatives on compounding at the associated South American plant at Bogota.

Goodrich has begun production of truck tires using wire cord, it was recently announced by J. E. Gulick, general manager of the company's tire manufacturing division. The new tires which have fewer plies than tires of the same section size made with conventional cord fabric are the outgrowth of a development program under

way since before the war. According to Mr. Gulick, the thinner wire cord runs cooler than conventional tires under equivalent conditions of service. The higher strength of the wire cord tire plus its cooler running are expected to give enough greater total mileage to "more than offset what now appears to be the high initial cost of the tire," Mr. Gulick said.

English motordom is reported as being keenly interested in a lightweight six-seater automobile of progressive design evolved by Sir Roy Fedden, famous British aircraft engine expert. True to the English preference for small, high-speed motors, the car has a four-cylinder, aluminum-engine of only 122 cubic inches' piston displacement, little more than half the motor capacity of popular-make American cars. Its predicted acceleration is from standing to 30 m.p.h. in five seconds, to 50 m.p.h. in 11.6 seconds, and to 70 m.p.h. in 24.1 seconds, which compares favorably with American small cars. For suspension, the British automobile uses the same rubber-in-torsion principle found in the Goodrich Torsilastic spring, which proved its practicality and advantages in several thousands of urban buses. Even in America, only one full-size passenger car, the "BFG Special" assembled by Goodrich engineers, has thus far been torsion-rubber sprung. However there seems to be an excellent chance that within a few years, the rubber torsion will repeat the history of other automotive advances that made their debuts in buses and were then introduced into passenger cars.

MIDWEST

Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill., has appointed Albert Musschoot, a member of the company's general engineering staff at Philadelphia, assistant to the chief engineer, with headquarters at the main offices in Chicago. In this capacity he will be directly responsible to Richard F. Bergmann, vice president and chief engineer. Mr. Musschoot, a mechanical engineering graduate of Massachusetts Institute of Technology, 1936, has also had five years experience as a development engineer with a large manufacturer of conveying and power transmission machinery. He entered the U. S. Army Ordnance in 1941 as a reserve officer.

Dryden Rubber Co., 1014 S. Kildare Ave., Chicago 24, Ill., has elected to the board of directors Isaac W. Robertson, manager of the Detroit branch.

Midwest Rubber Co., 17227 Conant Rd., Detroit 12, Mich., has announced the signing of Robert E. Thomas as factory superintendent and chief chemist. Mr. Thomas previously had been with International Latex Corp. for two years and prior to that with the Miller division of the The B. F. Goodrich Co. for more than 15 years.

The Servus Rubber Co., manufacturer of rubber and canvas footwear, Rock Island, Ill., has announced through Superintendent Robert E. Clayton that Allen M. Varney has joined its staff as chief chemist. Mr. Varney formerly held the same position with LaCrosse Rubber Mills, LaCrosse, Wis.

New Monsanto Plant

Monsanto Chemical Co., St. Louis 4, Mo., announced the completion of a new $3,000,000 plant at Monsanto, Ill., for the manufacture of Santomerse No. 1, a synthetic detergent with a wide variety of industrial and home uses. The plant, a one-story concrete building, gives the company additional large-scale facilities for manufacturing the detergent. Production will also continue at Monsanto's Nitro, W. Va., plant which has manufactured Santomerse for many years. The product's properties are such that it provides wetting out, dispersing, emulsifying, penetrating, and cleaning actions all in one operation. It is available in bead form for household use and also in flake form for industrial applications.

Monsanto has opened a new office in the Widener Bldg., Juniper and Chestnut Sts., Philadelphia, Pa., which will handle all Monsanto sales with emphasis on organic, phosphate, and Merrimac Division products.

Personnel Announcements

Elmer P. Wheeler has been appointed director of a newly formed section of industrial hygiene in the medical department at Monsanto. He will be in charge of industrial hygiene in all Monsanto plants in this country, with headquarters at the general offices in St. Louis. Mr. Wheeler had been serving with the U. S. Army Industrial Hygiene Laboratory in both civilian and military capacities. Previously he had been with the division of industrial hygiene of the New Hampshire State Board of Health. He was graduated from the University of New Hampshire in 1936 with a B.S. degree in chemistry and did graduate work at the Massachusetts Institute of Technology for 1½ years.

Ralph J. Holtschlag and Robert E. Howard have been promoted to group leaders in the St. Louis research department of the organic chemical division. Mr. Holtschlag, now group leader in charge of small-scale and interim production activities in the department, was graduated from St. Louis University in 1938 with a B.S. degree in chemistry. He joined Monsanto that year as an analytical chemist and in 1941 was transferred to the interim production department. Mr. Holtschlag also is a member of the American Institute of Chemical Engineers.

Dr. Howard, who came to the company in 1943 as a research chemist, will be group leader in charge of pilot-plant activities. He was graduated from Purdue University in 1940 with a B.S. degree in chemistry; he received his M.S. degree in 1941 and a Ph.D. in 1942. Dr. Howard is a member of the AICE, American Chemical Society, and Sigma Xi.

Three appointments in the research department of the central research laboratories, Dayton, O., were announced August 18 by Malcom Haring, laboratory director. Robert A. Staniforth has been made chief of the chemistry section; Raymond Davis, Jr., has been promoted to the position of group leader in physics; and Wilson H. Power has been advanced to group leader of fundamental research.

Dr. Staniforth, a native of Cleveland, O., attended Western Reserve University and received his doctorate from Ohio State. He came to Monsanto from General Aniline & Film Corp. in 1944 and has been group leader of fundamental research since July, 1946.

Dr. Davis, born in Washington, D. C., received his bachelor's and master's degrees at the University of Maryland and his doctorate at Yale. He was formerly employed by Dow Chemical Co. and served four years in the Chemical Warfare Service. He joined Monsanto in February, 1946.

Dr. Power, a native of Spokane, Wash., obtained his bachelor's degree at the Missouri School of Mines, his master's degree at Carnegie Institute of Technology, and his doctorate at the University of Maryland. He was previously employed by the Armstrong Cork Co., and by the Naval Research Laboratory. He came to Monsanto in July, 1946.

Leaves of absence to attend the advanced management program of the Harvard University Graduate School of Business Administration have been awarded R. S. Wobus and William M. Russell by Monsanto. Mr. Wobus, manager of the company's Norfolk, Va., plant, and Mr. Russell, branch manager, organic chemicals division, Detroit territory, will enroll in the 13-week program for the fall term of 1947.

Management leaves of absence for the Harvard program were formally instituted by Monsanto last June, when the company announced that four leaves per year would be granted, two for the fall term and two for the spring term. Previously management leaves of absence had been experimentally awarded Robert U. Haslanger, assistant to William M. Rand, Monsanto's president, and Alfred W. Long, comptroller of the company's plastics division at Springfield, Mass.

Merritt Engineering & Sales Co., Inc., has changed its name to Merritt-Monsanto Corp. The organization, which manufactures veneer- and plywood-making machinery, became a part of Monsanto Chemical Co. in 1944, when Monsanto acquired I. F. Laucks, Inc., of which Merritt Engineering & Sales Co. had been a part since 1935.

Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill., has retained E. W. Deck, until recently general manager of the Trent Tube Mfg. Co., as a consultant on manufacturing research. Before the war, Mr. Deck was engaged in research and development on steel production and fabrication processes for the Union Carbide & Carbon Corp. During the war he filled an administrative position with the Manhattan Project at Oak Ridge, Tenn. Before entering industry, Mr. Deck was an instructor in mechanical engineering at Harvard University.

Elkhart Rubber Works, Elkhart, Ind., manufacturer of molded goods, pump valves, gaskets, packings, and industrial custom-made specialties, is adding to its present production space approximately 15,000 square feet. The new building, to adjoin the present main plant, is of single-story monitor-type masonry and steel construction. The new addition will add to press room capacity and table operations. F. W. Adams, president and general manager, estimates construction will be completed the latter part of September and new equipment installations ready for production some time within the following month.

OBITUARY

Earle W. McMullen

EARLE W. McMULLEN, since 1935 director of research at Joplin for The Eagle-Picher Co., Cincinnati, O., and prominent in engineering chemistry, died August 26 at a hospital in Pittsburg, Kan. Pigments and vehicles had claimed his interest for many years, and he also pioneered in water emulsion paints for coating industrial products.

Mr. McMullen was born in Picton, Ont., Canada, July 10, 1887. He was graduated from Armour Institute of Technology in 1908. Then he taught chemical engineering there. His first professional position was with Simmons Co., Kenosha, Wis., where he was director of research for 15 years. Later he went with Celotex Corp. and then with Ault & Wiborg Co. in Cincinnati.

He was a member of the American Chemical Society; American Society for Testing Materials; American Society of Heating & Ventilating Engineers; American Institute of Mining & Metallurgical Engineers; American Institute of Chemical Engineering; and the Federation of Paint & Varnish Production Clubs. Besides, Mr. McMullen was an honorary member of the Dallas Paint & Varnish Club, a director of the Joplin Rotary Club, and a member of the Oak Hill Country Club in Joplin.

Surviving Mr. McMullen are his wife, a son, a daughter, and two brothers.

Charles M. Wernig

CORONARY occlusion caused the death, on July 27, of Charles M. Wernig, since 1931 vice president, sales manager, and a director of The Eclat Rubber Co. and The R.C.A. Rubber Co., both of Akron, O. Previously he had been in the sales department of the Firestone Tire & Rubber Co.

Mr. Wernig, who was born in Steyer, Upper Austria, on October 8, 1898, came to this country at an early age. He attended the University of Wisconsin for a few years and then Madison Business School, graduating in 1917. He belonged to the Kiwanis, Holy Name Society, and Portage and Fairlawn country clubs.

Requiem Mass was said on July 30 at St. Sebastian's Church, Akron, followed by burial in Holy Cross Cemetery, Akron.

Survivors include the widow, a brother, and two sisters.

J. C. Mills

THE recent death of J. Clifford Mills of Dominion Rubber Co., Ltd., Montreal, P.Q., Canada, has taken from the Canadian rubber footwear industry the man whose extensive experience helped formulate a system which provided his fellow Canadians with ample footwear during the war shortage years.

Born in Montreal 46 years ago, Mr. Mills held the position of assistant to the footwear division sales manager at the time of his death. He entered the employ of Dominion in 1920 and spent the years working progressively through various divisions of the company.

Surviving Mr. Mills are his wife and two sons.

Fred C. Batchellor

FRED COPELAND BATCHELLOR, sometime salesman of chemicals to the rubber industry, also for eight years with the United States Rubber Co., a sergeant in the 307th Infantry in the First World War, and at sea on an oil tanker in the Second World War, died in New York, N. Y., on August 24. A bachelor, he is survived by a brother and a sister.

Services and burial took place at Littleton, N. H., where he was born June 21, 1888

Fred F. Slack

FRED F. SLACK, chief chemist at the Corduroy Rubber Co., Grand Rapids, Mich., passed away on July 23, concluding an 18-year association with Corduroy. He was 53 years old at the time of his death in his Grand Rapids home. He had been ill for six months.

Born in Rutland, Vt., Mr. Slack attended grammar and high school there before leaving to attend Oberlin College. Following graduation, he joined the Miller Rubber Co. laboratory at Akron, O., and stayed four years. Before coming to Corduroy he held the position of chief chemist with the Cooper Corp., Findlay, O., for nine years.

A member of the American Chemical Society and the Society for Testing Materials, Mr. Slack was also an active Mason. He belonged to York Lodge No. 410, F&AM, DeWitt Clinton Consistory, Saladin Temple Mystic Shrine, the Torch Club, and the Park Congregational Church.

Mr. Slack is survived by his wife, a son, two daughters, and two grandsons.

Private services were held on July 24 at the Metcalf Mortuary, Grand Rapids.

FINANCIAL

American Cyanamid Co., New York, N. Y., and subsidiaries. First six months, 1947: net profit, $4,686,301, equal to $1.58 each on 2,737,526 common shares, contrasted with $4,261,869, or $1.44 each on 707,020 shares, in the initial half last year; net sales, $103,555,216, against $85,012,396; taxes: $3,000,000, against $3,100,000.

American Zinc, Lead & Smelting Co., Columbus, O. Initial half, 1947: net income, $666,564, equal to 74¢ a common share, contrasted with net loss of $120,262 in the same months a year ago.

Baldwin Locomotive Works, Philadelphia, Pa. Six months ended June 30: consolidated net income, $1,536,093, equal to 78¢ each on 1,875,553 common shares; sales, $50,569,333.

Brown Rubber Co., Inc., Lafayette, Ind. Six months to June 30: net earnings, $413,299.50 (greater than any previous full year net profit in the company's history), equivalent to $1.64 a share, contrasted with $154,626, or 61¢ a share, a year earlier.

Anaconda Wire & Cable Co., New York, N. Y. First half 1947: net income, $4,638,251, equal to $10.99 a share against $578,949, or $1.37 a share in the 1946 period.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. Initial half, 1947: net income, $9,999,606, equal to $4.13 each on 2,336,740 common shares, contrasted with $1,914,800, or 76¢ a share, in the 1946 half; net sales, $131,504,956, against $65,247,921; provision for federal and Canadian income taxes, $6,134,558, against $1,248,004.

Columbian Carbon Co., New York N. Y. and subsidiaries. Six months ended June 30: net income, $3,231,259, equal to $2 a share, compared with $2,668,191, or $1.65 a share, in the corresponding months a year ago ago; sales, $20,606,010, against $16,527,105.

Crown Cork & Seal Co., Inc., Baltimore, Md., and wholly owned domestic subsidiaries. First half, 1947: net income, $1,881,830, equal to $2.66 a common share, compared with $1,200,857, or $1.53 a share, in the same months last year; net sales, $35,190,523, against $27,701,063.

DeVilbiss Co., Toledo, O., and wholly owned subsidiary. Six months ended June 30, 1947; net income, $475,602, equivalent to $1.59 a common share, contrasted with $399,295, or $1.27 a share, in the same months of 1946.

Dow Chemical Co., Midland, Mich. Year ended May 31, 1947: net income, $12,729,991, equal to $9.22 each on 1,248,706 common shares, compared with $6,707,215, or $4.40 a share, in the preceding fiscal year: consolidated sales, $130,426,838, a new high and 28% above the preceding year's figure.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and wholly owned subsidiaries. Initial half, 1947: net income, $61,619,650, equal to $5.13 each on 11,121,927 common shares outstanding, compared with $55,731,895, or $4.67 each on 11,121,962 common shares in the corresponding period a year ago; sales, $378,671,184, against $307,852,718; provision for federal income taxes, $32,590,000, against $28,040,000.

Electric Storage Battery Co., Philadelphia, Pa., and wholly owned subsidiaries. First half, 1947: net profit, $2,608,415, equal to $2.87 a share, against $1,533,940, or $1.69 a share, in the 1946 half.

General Motors Corp., Detroit, Mich. First six months, 1947: net profit, $147,622,834, equivalent to $3.20 a common share, compared with net loss of $19,804,090 in the first half of 1946, when strikes and material shortages hampered production; net sales, $1,746,421,483, against $492,260,800; provision for taxes, $116,215,000, against $79,495,000.

Hewitt-Robins, Inc., Buffalo, N. Y. First six months 1947: net profit $726,311, equal to $2.60 a share, against net loss of $245,178 a year earlier; net sales, $11,138,914, against $6,237,998.

Flintkote Co., New York, N. Y., and subsidiaries. Twenty-eight weeks to July 12: net income, $4,333,033, equal to $3.49 each on 1,183,921 common shares, against $1,824,878, or $1.38 a share in the corresponding period last year; net sales, $37,787,893, a new high, against $26,171,860.

B. F. Goodrich Co., Akron, O., and subsidiaries. First six month, 1947: net income, $11,264,245, equal, after preferred dividends, to $7.82 a common share, compared with $12,470,390, or $8.74 a share, in the like period last year; reserve for contingencies, $2,000,000, against $3,000,000; net sales, $201,283,642, against $163,857,141; income taxes, $9,008,000 against $11,231,000.

Goodyear Tire & Rubber Co., Akron, O. First half, 1947: consolidated earnings, $11,601,416, equal to $4.90 a common share, contrasted with $15,088,189, or $6.59 a share, in the corresponding months of 1946; sales, $316,467,215, against $282,736,171; provision for income taxes, $17,950,887, against $20,741,965; reserve for foreign investments, $2,000,000, against $4,000,000.

Intercontinental Rubber Co., Inc., New York, N. Y., and subsidiaries. First half, 1947: net loss, $12,973, compared with net profit of $90,304 in the first six months of 1946; provision for Mexican income taxes, $15,497, against $41,897.

Link-Belt Co., Chicago, Ill., and subsidiaries. Six months to June 30; net income, $3,341,955, equal to $4.14 a common share, against $1,029,654, or $1.28 a share, in the 1946 period; net sales, $41,891,417, against $24,435,111.

Minnesota Mining & Mfg. Co., St. Paul, Minn., and subsidiaries. Initial half, 1947: net profit, $5,595,949, equal to $2.87 a share, against $3,697,006, or $1.89 a share, in the first six months of 1946.

National Automotive Fibres, Inc., Detroit, Mich., and wholly owned subsidiary. June half: net profit, $949,169, equal to $1 a common share, against $407,055, or 43¢ a share, in the 1946 period.

National Lead Co., New York, N. Y., and wholly owned domestic subsidiaries. June half: net income, $6,479,049, equal to $1.76 a common share, contrasted with $5,069,455, or $1.31 a share, in the like period last year; net sales, $130,105,900, against $78,910,059.

St. Joseph Lead Co., New York, N. Y., and domestic subsidiaries. First half, 1947: net income, $6,706,981, against $2,793,061 in the corresponding period a year ago; sales, $38,258,533, against $26,356,461; provision for taxes, $2,688,981, against $866,532.

Skelly Oil Co., Kansas City, Mo., and subsidiaries. Six months ended June 30, 1947: net income, $7,621,151, equal to $7.76 each on 981,348 common shares, contrasted with $3,469,197, or $3.53 a share, in the corresponding months of 1946; provision for taxes, $2,559,300, against $881,400.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. Second quarter, 1947: net income, $8,073,650, equal to 90¢ a share, against $4,831,797, or 55¢ a share, in the 1946 quarter; sales, $66,957,845, against $62,589,320.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. Six months ended June 30: net profit, $1,124,260, equal to $1.79 a share, against $649,736, or $1.03 a share, in the corresponding period last year.

Seiberling Rubber Co., Akron, O. First six months, 1947 (including a strike period): net income, $52,178, against $615,873 in the comparable 1946 months; net sales, $13,421,609, against $13,860,961.

Socony-Vacuum Oil Co., Inc., New York, N. Y. Six months ended June 30: net earnings, $40,900,000, equal to $1.31 a share, against $22,800,000, or 73¢ a share, in the like period last year.

Sun Chemical Corp., New York, N. Y. First half: net profit, $804,038, equal to 63¢ each on 1,196,283 common shares, against $636,892, or 48¢ each on 1,131,283 shares in the first half of 1946; net sales, $18,577,084, against $13,431,727.

Thermoid Co., Trenton, N. J., and subsidiaries. Six months to June 30: net profit, $506,060, equal to 72¢ a share, against $205,234, or 23¢ a share, in the same months of 1946; sales, $12,488,522, against $10,942,967.

Timken Roller Bearing Co., Canton, O. First half, 1947: net profit, $7,370,780, equal to $3.04 each on 2,421,380 capital shares, contrasted with net loss of $991,541 in the 1946 half.

United Engineering & Foundry Co., Pittsburgh, Pa. Initial half, 1947: net income, $1,411,000, equal to $1.69 each on 820,746 common shares, compared with $673,176, or 79¢ a share, a year earlier; net sales, $18,320,426, contrasted with $8,710,818.

United Carbon Co., Charleston, W. Va. Six months ended June 30: net income, $1,558,594, equal to $1.96 a common share, against $1,369,671, or $1.72 a share, in the comparable months last year.

United States Rubber Co., New York, N. Y. June half: net income, $11,020,729, equivalent to $4.78 a common share, contrasted with $9,906,886, or $4.15 a share, a year earlier; consolidated net sales, $283,329,180, a record for a half-year, against $51,619,172.

Westinghouse Air Brake Co., Wilmerding, Pa., and subsidiaries. First six months, 1947: net profit, $6,578,155, equal to $2.07 a share, compared with $4,292,710, or $1.35 a share, in the 1946 period.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. First half, 1947: net profit, $633,434 equal to $2.11 a share against $686,973, or $2.29 a share, in the same period last year.

Canada

Paul M. Irwin, manager, special brands sales and the tire engineering and service department of the tire division, Dominion Rubber Co., Ltd., Montreal, P. Q., was recently decorated with the M.B.E. by the Governor General of Canada, with whom he had been associated in action in the European theatre.

Monsanto (Canada), Ltd., Toronto, Ont., on August 25 announced a general program which will increase its overall Canadian productive capacity by at least 100% in two years. Vice President Leo E. Ryan declared a substantial increase would be made in productive capacity for phenolic resins which are produced at Montreal together with polystyrene. Other expansion, he stated, has not been specifically outlined. Mr. Ryan said a new building program already was under way at the Montreal plant.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co.	A & B	0.25 q.	Oct. 1	Sept. 16
Armstrong Rubber Co.	4¾% Pfd.	0.59⅜ q.	Oct. 1	Sept. 16
Boston Woven Hose & Rubber Co.	Com.	$0.50 q.	Aug. 25	Aug. 15
Brunswick-Balke-Collender Co.	Com.	0.25	Sept. 15	Sept. 2
Collyer Insulated Wire Co.	Com.	0.30 incr.	Aug. 1	July 24
Crown Cork & Seal Co.	Com.	0.40	Aug. 29	Aug. 8
Crown Cork & Seal Co.	Pfd.	0.50 q.	Sept. 15	Aug. 22
Crown Cork International	Pfd. A	0.40 accum.	Oct. 1	Sept. 10
Dewey & Almy Chemical Co.	Com.	0.35	Sept. 15	Aug. 29
Firestone Tire & Rubber Co.	Pfd.	1.12½ q.	Sept. 1	Aug. 15
Flintkote Co.	Com.	0.50	Sept. 15	Aug. 29
Garlock Packing Co.	Com.	0.25 q.	Sept. 30	Sept. 20
General Electric Co.	Com.	0.40	Sept. 25	Sept. 19
General Motors Corp.	Com.	0.75	Sept. 10	Aug. 14
General Motors Corp.	$5 Pfd.	1.25 q.	Nov. 1	Oct. 6
General Motors Corp.	$3.75 Pfd.	0.75	Nov. 1	Oct. 6
General Tire & Rubber Co.	Com.	0.25 q.	Aug. 29	Aug. 19
B. F. Goodrich Co.	Com.	1.00	Sept. 30	Sept. 12
B. F. Goodrich Co.	Pfd.	1.25 q.	Sept. 30	Sept. 12
Goodyear Tire & Rubber Co.	Com.	1.00	Sept. 15	Aug. 15
Goodyear Tire & Rubber Co.	Pfd.	1.25 q.	Sept. 15	Aug. 15
Johnson & Johnson	New	0.10 init.	Sept. 15	Aug. 28
I. B. Kleinert Rubber Co.	Com.	0.25	Sept. 12	Aug. 29
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Aug. 1	July 19
Raybestos-Manhattan, Inc.	Com.	0.37½	Sept. 12	Aug. 29
Seiberling Rubber Co.	Pfd.	1.13 q.	Oct. 1	Sept. 15
Seiberling Rubber Co.	Pfd. "A"	1.25 q.	Oct. 1	Sept. 15
Swan Rubber Co.	Pfd.	1.20 q.	Aug. 1	July 22
Thermoid Co.	Com.	0.20 q.	Sept. 15	Sept. 3
Tyer Rubber Co.	$4.25 Pfd. (New)	1.06¼ q.	Aug. 15	Aug. 11
United Elastic Corp.	Com.	0.75 q.	Sept. 10	Aug. 22
Viceroy Mfg. Co., Ltd.	Com.	0.09 q.	Sept. 15	Sept. 1
Westinghouse Air Brake Co.	Com.	0.50 incr.	Sept. 15	Aug. 15

Patents and Trade Marks

APPLICATION

United States

2,423,122. **Flexible Joint for Plain End Tubes.** J. P. Stephens, Kansas City, Mo., assignor to Gustin-Bacon Mfg. Co., a corporation of Mo.

2,423,138. **Belt Including Tension, Neutral Axis and Compression Sections, a Woven Fabric Breaker Strip Surrounding These Sections, and at Least One Strand of Wire Wrapped thereover.** M. A. Crosby, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,423,345. **In an Dynamoelectric Machine Including a Stack of Electrically Insulated Laminations and One or More Supporting Bearing Plates, a Layer of Thermoplastic Adhesive Material between Adjacent Laminations and between These Laminations and the Plate as Sole Means for Securing Laminations and Plate together.** H. C. Roters, Roslyn, N. Y., assignor to Casner Patents, Inc., a corporation of Del.

2,423,355. **Earphone Socket Including a Compliant Sheet Material Doubled over upon itself.** P. S. Veneklasen, Saugus, Mass.,assignor to United States of America, as represented by the Executive Secretary of the Office of Scientific Research & Development.

2,423,356. **Pessary.** C. C. Waterbury, assignor to Diaphragm & Chemical Co., both of Chicago, Ill.

2,423,407. **Belt Conveyor Idler Including a Plurality of Idler Rolls Each Including a Metal Hub, an Axle, a Sleeve of Resilient Material Closely Embracing the Hub, and Anchored thereto, and Means for Reinforcing the Annular Base of the Sleeve against Stretching.** A. Searles, Moscow, Pa., and C. A. Swartz, Yonkers, N. Y.

2,423,503. **Composite Plastic Sheet Including a Layer of Molecularly Oriented Polyvinyl Alcohol.** E. H. Land, Cambridge, J. Mahler, Brookline, and W. H. Ryan, assignor to Polaroid Corp., both of Cambridge, both in Mass.

2,423,579. **Corrugated Belting.** A. J. Buren, Cullom, Ill.

2,423,581. **For the Protection of Clothing, a Bib Including a Sheet of Transparent Water-Repellent material.** F. Clark, Los Angeles, Calif.

2,423,749. **Flexible Photographic Film Element Including a Transparent Flexible Support Composed of Orientable Polyvinyl Fluoride and a Layer of Polyvinyl Acetate.** P. R. Austin, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,423,753. **Shoe with a Heel and a Heel Lamination and a Plurality of Globular Rubber Tread Elements Rotatably Mounted in the Heel and Heel Lamination.** W. W. Brooks, New York, N. Y.

2,423,755. **Structure Including a Base Solid and a Resin Body Attached thereto by a Film of a Cyclized Polymethylpentadiene.** J. D. Calfee, Westfield, and D. W. Young, Roselle, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,423,771. **A Gasket Including a Ring Having a Body Consisting of Asbestos, a Flaky Material and Rubber, and Additional Sealing Means Including an Insert in the Body of Soft Tacky Material Having as Its Major Constituents Cork and Polyisobutylene.** H. W. Gould, Evanston, assignor to Crane Packing Co., Chicago, both in Ill.

2,423,832. **Inflatable, Collapsible Military Pontoon Bridge.** J. J. Gearon, Chicago, Ill.

2,423,842. **For Bonded Wire Electric Strain Gages, a Protective Button of Waterproof Material Sealed to a Specimen to Be Tested.** D. McHenry, Denver, Colo., assignor to United States of America, as represented by the Secretary of the Interior.

2,423,889. **Watertight and Airtight Bag.** V. H. Hurt, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.

2,423,890. **For Inflating a Collapsible Article, a Bag Having One End Permanently Attached to the Article to Be Inflated, While the Other Has a Wide Opening Provided with Stiffening Strips Which When Brought together, Form a Bar on Which This End May be Rolled to Close the Bag and Squeeze Air into the Article to Be Inflated.** V. H. Hurt, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.

2,423,940. **Expansible Impact Container Provided with Yieldable Retaining Means.** C. P. Krupp, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,423,995. **To Increase the Heat Conductivity of a Pneumatic Tire, Thin Aluminum Filaments Wrapped about Individual Reinforcing Cords Distributed in the Rubber Body Portion of the Tire and also Extending Continuously and Helically through the Body Portion from One Bead Portion to the Other.** J. L. Reynolds, Richmond, Va.

2,424,129. **Massage Cap Including a Crown of Flexible Waterproof Material, a Base Band, to Fit Snugly the Head below the Hair, and a Plurality of Suction Caps Projecting Inwardly from the Crown.** D. Vincelle, Oakland, Calif.

2,424,225. **Seal Construction.** B. Dick, Ferguson, assignor to Wagner Electric Corp., St. Louis, both in Mo.

2,424,226. **Anti-Skid Arrangement for Shoes Including a Rubber Sole, a Plurality of Rubber Cleats Integral therewith, and a Metallic Framework for the Cleats.** E. Dufour, Aubonne, Switzerland.

2,424,315. **Fabric Tube Including a Pair of Fabric Strips Each Having an Impervious Resin Coating on One Side.** C. S. Hyatt and H. H. Brooks, assignor to Columbus Coated Fabrics Corp., all of Columbus, O.

2,424,383. **Buoyant Cable.** A. L. Duna, Worcester, Mass., assignor to American Steel & Wire Co., of N. J., a corporation of N. J.

2,424,419. **Accessory for a Fishing Rod Including an Open-End Container Having an Elastic Extension Element at One End.** L. J. Rosa, Detroit, Mich.

2,424,431. **In a Ball and Socket Joint, a Ball-Ended Stud and Rubber Rings Having Thermoset Resin-Impregnated Fabric Liners for Top and Bottom Portions, Respectively, of the Ball Ended Stud.** J. H. Booth, Detroit, Mich., assignor to Thompson Products, Inc., Cleveland, O.

2,424,462. **Compressive Athletic Supporter.** R. M. Hoey, Chicago, Ill., assignor to Kendall Co., Boston, Mass.

2,424,463. **Anti-Skid Ribbed Suction Sole for Shoes and Rubber Footwear.** E. C. Hogg, Elizabeth, N. J.

2,424,475. **Tray made from a Plurality of Identical Gridiron-Like Panels of Molded Thermoplastic.** E. K. Madan, Maplewood, N. J.

Dominion of Canada

441,426. **Closure for Containers Including in Combination a Tapered Outside Member of Flexible and Resilient Material and Thin Flexible Sheet Interposed between the Side of the Member and the Wall of the Opening of the Container.** G. I. Butler, Old Greenwich, Conn., U. S. A.

442,509. **Self-Sealing Fuel Container Composed of an Outer Layer of Raw Rubber, a Layer of Plasticized Neoprene, a Second, Harder Layer of Neoprene, and a Layer of Polyamide.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. J. Sullivan, Fairfield, Conn., U. S. A.

441,539. **Laminated Structure Includes Plies Sized with a Polyvinyl Alcohol Insolubilizing Agent; the Plies Are United with Polyvinyl Alcohol.** Canadian Industries, Ltd., Montreal, P. Q., assignee of E. R. Boller, Hudson, O., and W. E. Gordon, Wilmington, Del., both in the U. S. A.

441,587. **Containers for Liquid Fuels wherein the Fuel Retaining Wall Consists of at Least Two Layers of Fabric and at Least One Layer of N-Alkoxymethyl Polyamide Bonded together.** Imperial Chemical Industries, Ltd., London, assignee of L. Shakesby, Bradmore, and J. T. Watts, Blackley, all in England.

441,590. **Air-Space Electric Communication Cable, the Insulation of Which Includes One or More Than One, Insulating Cord Consisting of a Central Core of Fibrous, Flexible, but Non-Extensible Insulating Material, Surrounded by a Sheath of Normally Extensible Insulating Material.** International Standard Electric Corp., assignee of Western Electric Co., Inc., both of New York, N. Y., U. S. A. assignee of J. F. Morley and D. Nunn, both of London, England.

441,613. **An Elastic Electrically Heated Flexible Fabric.** Russell Mfg. Co., assignee of J. A. Hendley, both of Middletown, Conn., U. S. A.

442,545. **Valve for Sealing Fluids Under Conditions of Temperatures, Pressures, and Deforming Forces Which May Vary Widely.** J. C. Hobbs, Psainsville, O., U. S. A.

442,625. **Welted Boot or Shoe in Which the Sole Consists of a Substance Known as Celastic, and the Sole Is Applied to the Shoe Bottom by an Adhesive Solution Known as Peroxilin.** Leicester Cooperative Boot & Shoe Mfg. Society, Ltd., assignee of C. T. Sherriff, both of Leicester, England.

442,697. **In a Projectile, a Driving Band Covered with Oil-Impervious Rubber, and Tapering at Its Front End.** F. G. L. Johnson, Forest Green, Surrey, England.

442,742. **In a Propeller Hub Arrangement, a One-Piece Sealing Ring Including a Member of Resin Treated Fabric Molded within a Covering of a Synthetic Rubber.** Curtiss-Wright Corp., New York, N. Y., assignee of J. H. Sheets, Verona, N. J., both of the U. S. A.

442,749. **Wheel Brake and Clutch Device.** Dunlop Rubber Co., Ltd., London, assignee of H. J. Butler, Coventry, both in England.

442,816. **Device Including in Combination a Rigid Container for Two Different Fluids and Placed within the Container, a Flexible, Inflatable Bag.** J. Mercier, Neuilly-sur-Seine, Seine, France.

442,819. **Rubber-Hydrochloride Lined Metal-Foil Envelope.** C. A. Baer, New York, N. Y., U. S. A.

442,829. **In Apparatus for Forming Sheet Metal Parts Including Parts Including a Rigid Rotatable Matrix, a Deep Rubber Cylindrical Covering for the Matrix.** C. M. Johnson, Freeport, L. I., N. Y.

442,900. **Laminated Structure of Fibrous Material Adhered together by an Adhesive Composed of Polyvinyl Alcohol.** Canadian Westinghouse Co., Inc., Hamilton, Ont., assignee of J. C. Ford, Sharon, Pa., U. S. A.

442,904. **In a Hollow Metallic Propeller Blade Including Plates Forming an Interior Chamber, and Ribs Carried by the Plates Projecting into the Chamber, Resilient Means Intimately Bonded to and between the Ribs.** Curtiss-Wright Corp., New York, N. Y., assignee of F. B. Stulen, West Orange, N. J., both in the U. S. A.

442,989. **Electrical Connector for Joining Two Sections of High Potential Flexible Cable.** Western Electric Co., Inc., assignee of Bell Telephone Laboratories, Inc., both of New York, N. Y., assignee of C. A. Webber, Westfield, N. J., both in the U. S. A.

442,993. **For Decorating a Surface of Fibrous Material, Decorative Elements of Reticulated Sheet Material Secured by Means of Upstanding Decorative Beads of Hardened Synthetic Resin.** H. and S. Freiberg, both of London, England, S. Freiberg assignee of an undivided one-half interest from H. Freiberg.

United Kingdom

589,102. **Revolving Heel for Boots and Shoes.** W. B. Colledge.

589,172. **Termination for [illegible] Cables.** British Insulated Cables, Ltd., J. Chesworth, and J. Conning.

589,185. **Aquatic Sports Equipment.** Games Industries, Ltd., and A. Richardson.

589,259. **Sealing Devices for Rotary Shafts.** Curran Bros., Ltd., and C. Curran.

589,281. **Means for Damping Torsional Vibration.** R. W. Corbitt.

589,343. **Aircraft Landing Gear.** Firestone Tire & Rubber Co.

589,383. **Resilient Mountings.** Lord Mfg. Co.

589,489. **Coated Rubber Hydrochloride Films.** Wingfoot Corp.

589,492. **Thermoplastic Synthetic Resin Articles.** Plast-Applied Products, Ltd., and M. Simpson.

589,503. **Anaesthetic Apparatus.** H. A. E. Talley.

589,538. **Pivotal Joints.** Silentbloc, Ltd., and V. A. Trier.

589,552. **Heels,** M. Beck.

589,656. **Electric Terminals and Cable Connectors.** A. C. King and D. J. Battersby.

589,759. **Plastic Material for Use for Packing or Sealing Purposes.** B. B. Chemical Co., Ltd., and T. Stuart.

589,768. **Resilient Pressure-Sealing Devices.** De Havilland Aircraft Co., Ltd., J. A. Crowhurst, and J. W. Hetherington.

PROCESS

United States

2,423,143 **Ornamental Rubber Shoes.** E. Gottschalk, New York, N. Y.

2,423,260. **Extrusion of Hot Resinous Thermoplastic Tubing.** C. E. Slaughter, New Canaan, assignor to Extruded Plastics, Inc., Norwalk, both in Conn.

2,423,869-870. **Uniting Parts into a Composite Structure with the Aid of a Thermoplastic Resinous Material.** G. W. Blessing, Moorestown, N. J., assignor to Radio Corp. of America, a corporation of Delaware.

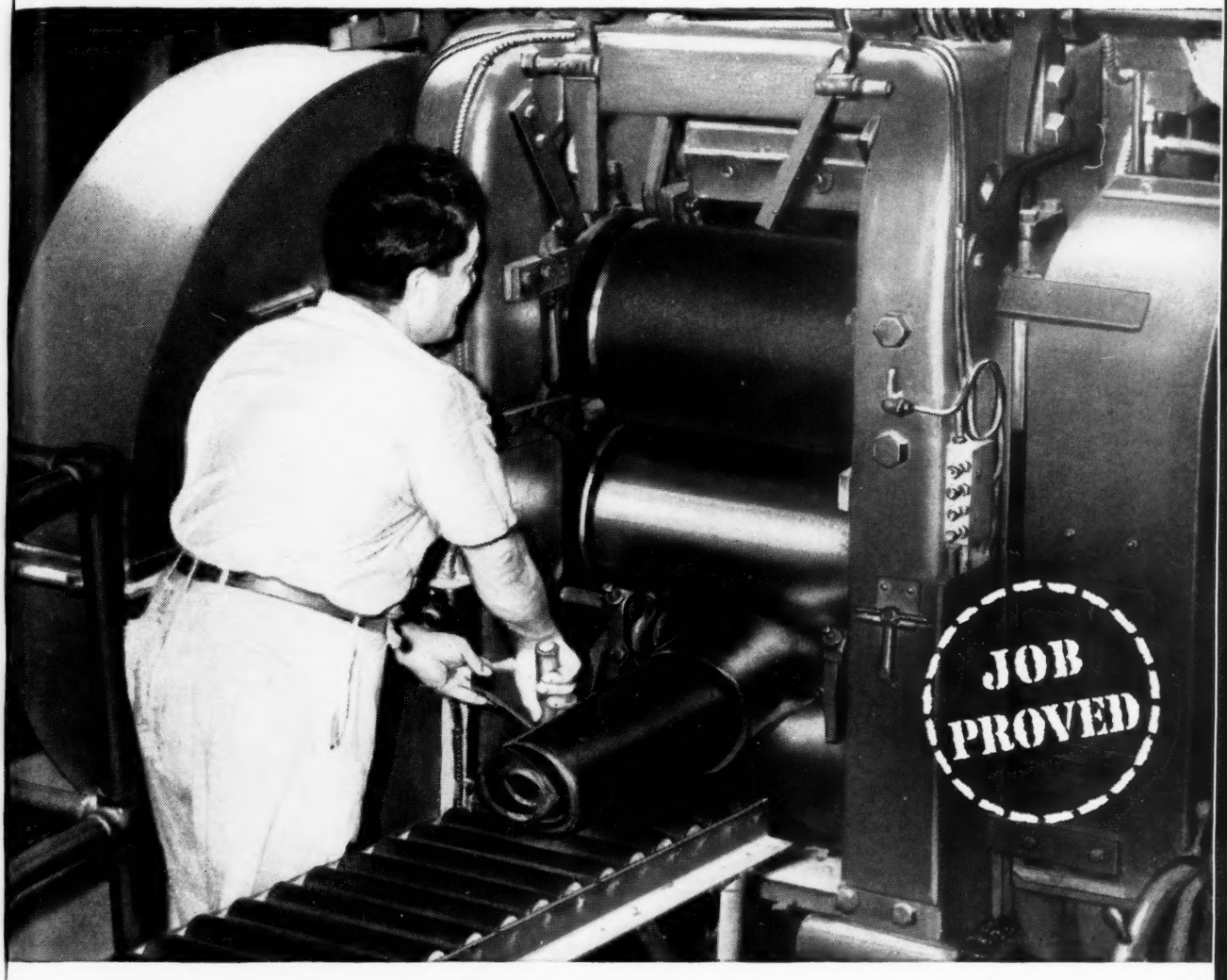
2,423,915. **Heating and Packaging Thermoplastic Molding Material.** G. W. Wacker, assignor to Clearing Machine Corp., both of Chicago, Ill.

2,424,386. **Coating Textile Fabric with Polyvinyl Resin.** R. H. Czeczowitzka, assignor to Texproof, Ltd., both of Pendleton, Salford, England.

Dominion of Canada

441,499. **Synthetic Linear Polyamide Articles of Improved Properties.** Canadian In-

Saving $2,000 a Year



SUNDEX RUBBER PROCESSING AID...

Gives Greater Strength and Wear-Resistance to GR-S Stocks for Heavy Footwear

A manufacturer of heavy rubber footwear recently tested samples of GR-S rubber made with Sundex 53, and samples made with three other products, including his regular processing aid. In every case the rubber that had been plasticized and softened with the Sun product had better tensile strength and gave better results in elongation and abrasion tests.

A saving of $2,000 a year was effected in this plant as a result of changing to Sundex 53 — a higher quality product that costs less.

Sundex 53 is clean, uniform and easy to handle. It can be used in making various colored rubbers (other than white) without causing discoloration.

For practically every type of rubber there is a Sun processing aid that will speed up manufacture and improve quality. They do not cause surface bloom even in exacting products like chemically-blown sponge rubber, white sidewall tires and pastel-colored articles. For full information about Sun's "Job Proved" rubber processing aids, write Department RW-9.

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SUN OIL COMPANY • ***Philadelphia 3, Pa.***
In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

Industries, Ltd., Montreal, P. Q., assignee of K. L. Berry, Hockessin, Del., U. S. A.

441,557. **Polytetrafluoroethylene Tape.** Canadian Industries Ltd., Montreal, P. Q., assignee of J. Alfthan, New York, N. Y., U.S.A.

441,592. **Forming a Cable Barrier Joint of Built-up Insulation Tape.** International Standard Electric Corp., New York, N. Y., U.S.A., assignee of E. C. Lee, London, England.

441,639. **Insulating Wire for Use as an Electrical Conductor.** C. G. Bonard, London, England, administrator of the estate of H. Dreyfus, deceased, in his lifetime of London, assignee of D. Finalyson, E. L. Greenwood, and W. J. Simpson, all of Spondon, England.

442,540. **Coating Adhesive Fabric.** H. A. Evans, Lynn, Mass., U. S. A.

442,541. **Elastically Contractible Adhesive Fabric.** H. A. Evans, Lynn, Mass., U. S. A.

442,584. **Transparent Films from a Normally Solid Polymer of Ethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. T. Peters, Wilmington, Del., U. S. A.

442,631. **Improved Process of Manufacturing Resinated Paper.** Paper Patents Co., Neenah, assignee of R. J. Auchter, Appleton, both in Wis., U. S. A.

442,723. **Molding a Reinforced Plastic Article of Complex Form.** Bristol Aeroplane Co., Ltd., assignee of H. C. Martin, both of Bristol, England.

442,748. **Processing a Normally Crystalline Vinylidene Polymer.** Dow Chemical Co., assignee of R. M. Wiley, both of Midland, Mich., U. S. A.

442,801. **Removing Fins from Products Molded from an Elastomer.** Crane Packing Co., assignee of W. E. Kopplin, both of Chicago, Ill., U. S. A.

442,980. **Conducting Exothermic Polymerization Reactions.** United Gas Improvements Co., Philadelphia, Pa., assignee of F. J. Soday, Baton Rouge, La., both in the U. S. A.

United Kingdom

589,044. **Insoles.** F. L. Ayers.

589,148. **Injection Molding of Organic Thermoplastic Materials.** British Celanese, Ltd.

589,221. **Curved Printing Plates from Thermosetting and Thermoplastic Materials.** E. S. Hole.

589,263. **Boots, Shoes, or the Like.** Dunlop Rubber Co., Ltd., and L. H. Ellis.

589,265. **Sealing Cellulose Ether Sheet Materials.** Sylvania Industrial Corp.

589,386. **Applying Insulating Coating.** J. U. Birnie.

589,452. **Thermoplastic Tubes.** S. J. Everett.

589,621. **Building Board.** Expanded Rubber Co., Ltd., and A. Cooper.

589,624. **Compression of Thermoplastic Compositions.** Bakelite, Ltd.

589,645. **Applying Coatings by Spraying.** C. F. Lumb.

CHEMICAL

United States

2,422,089. **Preparing Aryl Acrylates by Pyrolyzing the Corresponding Aryl Ester of Alpha-Acetoxypropionic Acid at a Temperature of 400° to 600° C.** E. M. Filachione, Philadelphia, and C. H. Fisher, Abington, both in Pa., assignors to United States of America, as represented by the Secretary of Agriculture.

2,423,092. **An Ethylene Glycol-Isopropylene Glycol-Sebacic Acid-Aconite Acid Polyester.** C. J. Frosch, Chatham, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,423,139. **In Making Chlorinated Furane Resins, the Step of Adding Chlorine to a Furfural-Containing Liquid in the Presence of Caustic Alkali.** J. Delmonte, Glendale, assignor on one-tenth to E. F. Lougee and 65% to R. Hemphill, both of Los Angeles, Calif.

2,423,179. **Concentrating Conjugated Dienes Containing Fewer than Seven Carbon Atoms from Mixtures Containing them in Small Amounts by Subjecting the Mixtures to a Process Involving Dimerization and Subsequent Depolymerization.** T. F. Doumani, R. Deery and A. C. McKinnis all of Long Beach. R. Deery, now by judicial change of name to R. F. Deering, assignors to Union Oil Co. of California, Los Angeles, both in Calif.

2,423,185. **Impregnating Materials with an Aqueous Solution of a Water-Soluble Salt of a Basic Amine-Aldehyde-Type Resin Composed of the Condensation Product of Formaldehyde with Dicyandiamide and with a Preformed Mineral Acid Salt of Guanyl Urea, and Subsequently Converting the Resin into the Water-Insoluble State by Removing the Water Solubilizing Acid Groups of the Salt Compound of the Resin.** W. Gundel and E. Gotte, Dessau, Germany, assignors, by mesne assignments, to Hydronapthene Corp., Wilmington, Del.

2,423,186. **Conditioning a Catalyst for Reacting Hydrocyanic Acid with Acetylene in the Vapor Phase to Produce Vinyl Cyanide.** C. R. Harris, Lockport, and W. W. De Atley, Niagara Falls, both in N. Y., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,423,220. **Preparing a Resin Composition Capable of Forming a Non-Skinning Emulsion in Water by Neutralizing with Sodium Silicate and Ammonia the Adduct of Maleic Anhydride and a Glyceride Drying Oil; the Anhydride Rings are Opened before Neutralization.** G. E. Eilerman, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,423,232. **Separation of Rosin Acid from Tall Oil.** S. E. Freeman, Pittsburgh, Pa., and S. W. Gloyer, Milwaukee, Wis., assignors to Pittsburgh Plate Glass Co., a corporation of Pa.

2,423,318. **Preparation of Vinyl Cyanide by Reacting Hydrogen Cyanide with Acetylene in the Presence of an Aqueous Solution of a Cuprous Chloride Complex, and Maintaining the Acidity of the Catalyst Solution at a pH not Exceeding 4 by Means of a Water-Soluble Aliphatic Polycarboxylic Acid.** B. W. Howk, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,423,353. **Polymethylene Diguanamines.** J. T. Thurston, Cos Cob, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,423,374. **Pyrolyzing Petroleum Oil in Vapor Phase in the Presence of a Diluent Gas to Produce Conjugated Diolefins Including Butadiene, and Aromatic Hydrocarbons Including Benzene.** N. K. Chaney, Moylan, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,423,375. **Dienes, Resin-Forming and Non-Resin-Forming Aromatic Hydrocarbons.** N. K. Chaney, Moylan, Pa., and E. L. Hall, Manchester, N. H., assignors to United Gas Improvement Co., a corporation of Pa.

2,423,377. **Determining the Proportion of Diolefin Material in Mixed Gases.** B. Ferguson, Jr., Media, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,423,388-389. **Purifying Styrene in Admixture with Phenyl Acetylene.** C. W. Jordan, Paoli, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,423,412. **Separating Styrene from a Mixture including Styrene and Xylene by Admixing Acetic Acid with the Mixture and Distilling.** E. H. Smoker, Drexel Hill, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,423,414. **Separation of Diolefin Material from a Mixture thereof with Monoolefin Material including Isoolefin Material.** F. J. Soday, Baton Rouge, La., assignor to United Gas Improvement Co., a corporation of Pa.

2,423,428-429. **Improving the Bonding Properties of Cellulosic and Non-Cellulosic Organic Textiles by Treatment with Melamine Formaldehyde Resin.** J. D. Pollard, Stamford Conn., assignors to American Cyanamid Co., New York, N. Y.

2,423,520. **Photopolymerization of Vinylidene Compounds in the Presence of N-Disubstituted Dithiocarbamic Esters.** L. M. Richards, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,423,530. **Synthesizing Alkyl Benzenes.** C. M. Thacker, Highland Park, and R. C. Swann, Skokie, assignors to Pure Oil Co., Chicago, all in Ill.

2,423,555. **Paper Coated with a Viscous Composition Including Chlorinated Rubber, Plasticizer, Wax, Resin and Volatile Solvent.** C. D. Ender, assignor to Hercules Powder Co., both of Wilmington, Del.

2,423,565. **Rendering Polyvinyl Butyral Resin Insoluble, Which Includes Mixing a Polyvinyl Butyral with a Butanol Modified Urea-Formaldehyde Resin and Heating for at least One hour at 82 to 116° C.** E. A. Rodman, Newburgh, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,423,583. **Process Which Includes Swelling Cellulose Acetate with a Solution Containing Allyl Methyacrylate Monomer, Methyl Methacrylate Monomer and Methacrylic Acid Monomer and Heating to Polymerize Absorbed Solution.** D. P. Cooper, Jr., Boston, Mass., assignor to Polaroid Corp., Dover, Del.

2,423,599. **Reacting Butadiene with a Member of the Group of Hydrogen Chloride and Hydrogen Bromide and Treating the Resulting Product to Obtain Alpha-Methallyl Alcohol.** J. Kamlet, New York, N. Y., assignor to Publicker Industries Inc., a corporation of Pa.

2,423,681. **Producing Butadiene by Vaporizing Ethanol, Passing the Resulting Vapors over a Catalytic Agent Including Magnesium Oxide Admixed and Digested with Silica in the Presence of a Strongly Alkaline Material and Containing a Promoter, while Maintaining the Catalytic Agent at a Temperature from 375 to 525° C.** D. J. Butterbaugh, Philadelphia, and Le R. U. Spence, Elkins Park, assignors to Rohm & Haas Co., Philadelphia, both in Pa.

2,423,760. **Polymerization Process Which Includes Mixing Liquefied Isobutylene and a Diluent Refrigerant at below 101°C., Stirring into the Mixture a Solution of Boron Trifluoride, and then Initiating the Polymerization Reaction by the Addition of Butyl Alcohol as Reaction Initiator.** N. M. Elmore, Elizabeth, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,423,761. **Insulating Coating Composition Including a Solution of a Polybutene in a Volatile Organic Solvent and a Wetting Agent from the Class of Amine Acetate Salts Soluble in the Polybutene.** H. C. Evans, Cranford, and D. W. Young, Roselle, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,423,786. **Creaming Natural and Synthetic Rubber Latices with the Aid of a Dilute Aqueous Volatile Alkali Solution of a Water-Insoluble Polyvalent Metal Salt of a Linear Polymeric Carboxyl Compound.** R. D. Freeman, assignor to Dow Chemical Co., both of Midland, Mich.

2,423,788. **Converting Aliphatic Olefins to Polyhydric Alcohols.** S. B. Lippincott, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,423,802. **Separating Alpha Methyl Styrene from a Mixture Containing Cumene.** O. C. Slotterbeck, Clark Township, and C. E. Morrell, Westfield, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,423,823. **Composition Including an Intimate Homogeneous Mixture of Cellulose Acetate-Butyrate Material and a Synthetic Linear Polyester Produced by Reacting Materials from the Class of Monohydroxy Monocarboxylic Acids and Mixtures of Glycols and Dicarboxylic Acids.** W. O. Baker, Morristown, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,423,835. **Process of Effecting Contacting Operations for Processing Hydrocarbons in a Reaction Chamber Containing a Contact Mass Subjected to Alternating On-stream and Regenerating Reactions.** E. J. Houdry, Ardmore, Pa., assignor to Houdry Process Corp., Wilmington, Del.

2,423,871. **Treating Deposited Neoprene Latex Articles after Vulcanization with Gaseous Ammonia for at Least One Hour to Improve Aging Characteristics.** P. D. Brass, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.

2,423,872. **Corrosion-Resistant Coating for Cartridge Cases Including an Alkoxy-Substituted Urea-Formaldehyde Condensation Product and an Extracted Pine Wood Pitch.** O. P. Clipper, assignor, by mesne assignments, to Libby-Owens-Ford Glass Co., both of Toledo, O.

2,423,927. **Constant Viscosity Hydraulic Fluid Composition Consisting of an Aromatic Compound and from 3% to 5% by weight of Polyisobutylene of Molecular Weight about 100,000 Carried thereby.** R. E. Burk and E. C. Hughes, Cleveland Heights, assignors to Standard Oil Co., Cleveland, both in O.

2,423,951. **Catalytic Process for the Production of Butadiene from Ethanol.** LeR. U. Spence, Elkins Park, and D. J. Butterbaugh, assignors to Rohm & Haas Co., Philadelphia, both in Pa.

2,423,981. **Composition Including a Polyvinyl Acetal Resin, a Plasticizer therefor, and an Organic Amide of the Formula R-CO-NHR' Where R Is an Alkyl Group Having Less Than Four Carbon Atoms, and R' Is an Alkyl Group Having More Than 13 and Less Than 19 Carbon Atoms.** D. S. Kaltreider, Springfield, Mass., assignor to Monsanto Chemical Co., St. Loui, Mo.

2,424,026. **Alkali-Resistant Plastic Mass Which Is an Inter-Condensation Product of Natural Resin Acid Chlorides and Fatty Acid Chlorides; the Acid Chlorides Have at Least Six Carbon Atoms in the Molecule.** H. I. Gilbert, Brooklyn, N. Y.

2,424,074. **Tall Oil Ester Resin Obtained by Heating Tall Oil With a Polymerized Ester of a Carboxylic Acid and an Aliphatic Unsaturated Monohydric Alcohol Containing an Olefinic Linkage between the Beta and Gamma Carbon Atoms.** F. A. Bent and E. A. Peterson, both of Berkeley, assignors to Shell Development Co., San Francisco, both in Calif.

2,424,084. **Production of Ethylene Oxide by the Direct Catalytic Oxidation of Ethylene.** H. de V. Finch, Berkeley, Calif., and Bergsteinsson, Billings, Mont., assignors to Shell Development Co., San Francisco, Calif.

2,424,110. **Heat Sealing with Partially Hydrolyzed Polyvinyl Acetate.** G. O. Morrison, Shawinigan Falls, Quebec, assignors to Shawinigan Chemicals Ltd., Montreal, both in P.Q., Canada.

2,424,143. **Producing an Interpolymerization Product of a Secondary Olefin with a Tertiary Olefin.** O. H. Brown, Baytown Tex., assignor to Standard Oil Development Co., a corporation of Del.

2,424,175. **Vulcanization of Rubber or Butadiene Styrene Copolymer in the Presence of Sulfur and a Compound Having the Formula**

$$R_1—S—A—N\begin{matrix}R_2\\R_3\end{matrix}$$

Know How + Perbunan = a top-notch pipe wiper!

THE QUESTION WAS . . . to find out how rubber drill pipe wipers could be made to stand up better under the beating they have to take from constant friction, abrasion and contact with crude oil, gas and other rubber-destroying hydrocarbons in oil field operations.

THE ANSWER WAS . . . A PERBUNAN compound plus the proper design. This combination was developed by research engineers of HARBOR RUBBER & PLASTICS, INC., Long Beach, California, working with the engineers from the BAROID SALES DIVISION OF NATIONAL LEAD COMPANY in designing a replaceable insert pipe wiper. The Perbunan compound provided a flexible, replaceable insert *with exceptional resistance to friction, abrasion, oil, and other hydrocarbons normally destructive to rubber!*

ALSO REMEMBER THIS: Perbunan now contains a new stabilizer that permits its use in a wide variety of colored articles where delicate colors are desired . . . and where discoloration of the rubber part or materials in contact with it would be objectionable.

If You Have a Rubber Question that needs an answer . . . please write to our office nearest you.

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THE RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

ENJAY COMPANY, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 221 North LaSalle St., Chicago 1, Illinois; 378 Stuart Street, Boston 17, Massachusetts. West Coast Representatives: H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

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where R Is an Organic Radical with the Free Valence on a Carbon Atom, A Is an Alkylene Group with Free Valences on Different Carbon Atoms, R_2 Is of the Class of Hydrogen, and Aliphatic and Aromatic Groups Attached to the Nitrogen through a Carbon Atom, and R_3 Is an Aliphatic Hydrocarbon Group. P. C. Jones, Silver Lake, and R. A. Mathes, Akron, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,424,182. **Synthetic Rubber-Like Material with High Oil and Freeze Resistance and Good Processing Characteristics, Obtained by Copolymerization of a Mixture Including Butadiene, Acrylonitrile and an Aliphatic Vinylethinyl Carbinol.** C. J. Mighton, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,424,186. **Continuous Sulfuric Acid Extraction of Isobutylene from Hydrocarbon Mixtures.** J. W. Packie, Green Village, and W. H. Rupp, Mountainside, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,424,583. **Phenol-Formaldehyde-Protein Plastic Materials for Continuous Extrusion or Injection Processes.** F. E. Calvert, assignor to Drackett Co., both of Cincinnati, O.

Dominion of Canada

441,482. **Production of Butadiene by Subjecting Anhydrous Vapors of 1, 2-Dichlorbutane to Thermal Dehydrohalogenation in the Absence of a Basic Agent and of a Catalyst at from 500 to 600°C. in an Unpacked Reaction Vessel.** Canadian Industries, Ltd., Montreal, P. Q., assignee of O. W. Cass, Niagara Falls, and A. O. Rogers, Lewiston, both in N. Y., U. S. A.

441,483. **Colored Resin Molding Compound.** Canadian Industries, Ltd., Montreal, P. Q., assignee of B. M. Marks, Upper Montclair, N. J., U. S. A.

441,484. **Composition of Matter Including a Synthetic Linear Polyamide and an Amino-Hydrogen-Containing Aromatic Amine.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. DeW. Graves, Wilmington, Del., U. S. A.

441,485. **Fiber-Forming Synthetic Linear Polyamide Plasticized with a Monocarboxylic Acid-Polyhydric Alcohol Ester, in Which the Monocarboxylic Acid Constituent Contains at Least Six Carbon Atoms, and at Least One Hydroxyl Group of the Polyhydric Alcohol Is Unesterified.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. T. Peters, Wilmington, Del., U. S. A.

441,486. **Organic Sulphonyl Chlorides.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. E. Holbrook, A. A. Baum, and W. J. Clem, all of Wilmington, Del., and A. L. Fox, Woodstown, N. J., both in the U. S. A.

441,487. **Aqueous Dispersion of Polymers of Ethylene of Horny Consistency and Polyisobutylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. F. Flint and R. B. F. F. Clark, both of Manchester, Lancaster, Eng.

441,491. **Improved Polyamide Having a Relatively High Melting Point and Enhanced Affinity for Dyestuffs.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. M. Brubaker, Boothwyn, Pa., and D. D. Coffman, and F. C. McGrew, both of Wilmington, Del., both in the U. S. A.

441,492. **Plasticizing a Synthetic Linear Polyamide.** Canadian Industries Ltd., Montreal, P. Q., assignee of M. M. Brubaker, Boothwyn, Pa., U.S.A.

441,498. **Polymer of an N-Vinylphthalimide and Ethylene.** Canadian Industries, Ltd., assignee of W. E. Hanford, Wilmington, and J. R. Roland, McDaniel Heights, Del., U.S.A.

441,500. **Polymers of Ethylene and Vinylidene Chloride Obtained by Heating in the Presence of Benzoyl Peroxide.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. E. Hanford, Wilmington, and J. R. Roland, McDaniel Heights, both in Del., U.S.A.

441,501. **Obtaining Cork-Like Products from Polymers of Ethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. L. Alderson, Jr., Wilmington, Del., U.S.A.

441,503. **For Bonding Balloon Fabric, Organic Diisocyanate Modified Polyesters and Polyesteramides.** Canadian Industries, Ltd., Montreal, P. Q., assignee of B. J. Habgood and D. A. Harper, both of Blackley, Manchester, England.

441,505. **New and Improved Pastes Including a Polyvinyl Halide, an Aromatic Triester of Phosphoric Acid, Minor Proportions of a Glycol Ether Phthalate and a Hard Thermoplastic Polymer other than a Polyvinyyl Halide Which Is Soluble in a Mixture of the Aromatic Triester and the Glycol Ether Phthalate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of E. F. Brookman and L. M. Smith, both of Welwyn Garden City, England.

441,510. **Luminescent Cast Synthetic Resin Articles.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. L. Match, Jersey City, and M. McK. Renfrew, Arlington, both in N. J., U.S.A.

441,511. **Polymerized Nitroethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. E. W. Smith, Norton-on-Tees, England.

441,512. **Synthetic Resin Adhesive Including Wood Flour.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. L. Knott, St. Albans, and E. J. G. Bailey, Welwyn Garden City, England.

441,513. **In the Polymerization of a Mass Containing an Acrylic Compound, the Improvement of Carrying out the Reaction in the Presence of an N-Chlorinated Hydantoin.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. A. Jacobson, Landenberg, Pa., U.S.A.

441,516. **Composition Including a Copolymer of Vinyl Chloride and a Neutral Ester of a Saturated Alcohol and Fumaric Acid Modified with an Alkoxyalkyl Ester of an Aliphatic Dicarboxylic Acid Containing Four to 10 Carbon Atoms.** Canadian Industries, Ltd., Montreal, P. Q., assignee of H. J. Richter, Wilmington, Del., U.S.A.

441,517. **Reaction of a Hydrolyzed Interpolymer of Ethylene and Vinyl Acetate with a Compound Having a Plurality of Methylene Groups, Each of Which Is Attached to Nitrogen and Oxygen.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. C. Pease, Wilmington, Del., U.S.A.

441,520. **Modified Methyl Methacrylate Composition Obtained by Polymerizing a Dispersion of Monomeric Methyl Methacrylate in Water in the Presence of Trichloroethylene at 100 to 150° C., under Autogenous Pressure.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. L. Johnston, Claymount, Del., U.S.A.

441,524. **Addition of Tertiary Hydrocarbon Amine to Reduce the Tendency of Tetrafluoroethylene to Spontaneous Polymerization.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. E. Hanford, Easton, Pa., U.S.A.

441,525. **Tetrafluoroethylene Stabilized with Hydrocarbon Thiol to Prevent Polymerization at 25° C. and Superatmospheric Pressure.** Canadian Industries, Ltd. Montreal, P. Q., assignee of M. M. Brubaker, Boothwyn, Pa., U.S.A.

441,526. **Tetrafluoroethylene Stabilized with Ethylenically Unsaturated Hydrocarbon to Prevent Polymerization at 25° C and Superatmospheric Pressure.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. A. Dietrich, Claymount, and R. M. Joyce, Jr., Marshallton, both in Del., U.S.A.

441,531. **High Chlorine Content Resin Obtained by Chlorination of a Copolymer of Vinyl Chloride and Trichlorethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of O. W. Cass, Niagara Falls, N. Y., U.S.A.

441,532. **Copolymer of Vinyl Chloride and Trichlorethylene.** Canadian Industries, Ltd., assignee of O. W. Cass, Niagara Falls, N. Y., U.S.A.

441,533. **Polymeric Product Obtained by the Chlorination of a Copolymer of Vinyl Chloride and Vinylidene Chloride.** Canadian Industries, Ltd., Montreal, P. Q., assignee of O. W. Cass, Niagara Falls, N. Y., U.S.A.

441,534. **Polyvinyl Acetal Resin.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. S. Stamatoff, Nutley, N. J., U.S.A.

441,535. **Polymerization of Vinyl Acetate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. O. White, Arlington, N. J., U.S.A.

441,538. **Production of a Relief Image by Polymerizing to a Rigid Condition a Liquid Ethenoid Composition by Subjection to the Action of Heat or Light Rays.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. E. F. Gates, Welwyn Garden City, England.

441,542. **In the Manufacture of Composite Sheet Material, the Use of a Paste Including Ungelatinized Polyvinyl Chloride as the Sole Film Forming Agent Dispersed in a Medium Containing a Plasticizer Capable of Gelatinizing the Polyvinyl Chloride at a Raised Temperature.** Canadian Industries, Ltd., Montreal, P. Q., assignee of N. H. Brown, Audenshaw, Manchester, England.

441,544. **Providing a Solid Methyl Methacrylate Polymer with Improved Surface Characteristics.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. F. Bechtold, Wilmington, Del., U.S.A.

441,546. **Visible Light Transparent Plastic Sheet of Polymeric Methyl Methacrylate Mixed with Thorium Nitrate.** Canadian Industries Ltd., Montreal, P. Q., assignee of R. M. Goldrick, Arlington, and B. M. Marks, Newark, both in N. J., U.S.A.

441,547. **Preparation of Stable Aqueous Dispersions of Polymerized Alkyl Alkacrylates.** Canadian Industries Ltd., Montreal, P. Q., assignee of J. E. Smith, Wilmington, Del., U.S.A.

441,548. **Non-Fibrous Film of Water-Sensitive Material Impregnated with Softener and an Insoluble Resin Capable of Being Formed in situ at Temperatures from 60 to 90° C.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. D. Lanning, Williamsville, N. Y., U.S.A.

441,555. **Polythene Film-Forming Composition.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. L. Alderson, Jr., Wilmington, Del., U.S.A.

441,556. **Adhesive for Plywood Consisting of a Carboxylic Acid Catalyst and a Condensation Product of Formaldehyde with a Hydrolyzed Ethylene-Vinyl Acetate Interpolymer.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. H. Sharkey, and W. B. Clark, both of Wilmington, and H. M. Cadot, Greenville, both in Del., U.S.A.

441,617. **Composition Including an Organic Substance from the Group of Plasties and Elasties and a Polymeric Allyl-Type Ester of a Monobasic Organic Acid, as Plasticizer therefor.** Shell Development Co., San Francisco, assignee of D. E. Adelson, and H. Dannenberg, Berkeley, both in Calif., U.S.A.

442,585. **Improved Filaments of Synthetic Linear Polyamide.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. R. McClellan, Wilmington, Del., U.S.A.

442,586. **Preserving Rubber by the Incorporation of a Small Proportion of a Secondary Aromatic Amine and 0.00001 to 0.1%, by Weight Based on the Rubber, of a Metal Complex of Phthalocyanine.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. R. Vincent, Wilmington, Del., U.S.A.

442,587. **In a Molding Process for Tetrafluoroethylene, the Addition of Another Organic Film-Forming Material.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. W. Hill, Wilmington, Del., U.S.A.

442,590. **Obtaining Porous Articles of Polytetrafluoroethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. Alfthan, New York, N. Y., U.S.A.

442,663. **Making a Moldable Ligno-Cellulose Having an X-Ray Diffraction Pattern Characteristic of Dehydrated Wood.** University of New Hampshire, Durham, assignee of R. A. Caughey, Wilton, both in N. H., U.S.A.

442,666. **Heating a Polymerized Vinyl Chloride-Vinylidene Chloride Plastic in the Presence of a Quaternary Ammonium Base to Cure It.** Wingfoot Corp., assignee of T. H. Rogers, Jr., and R. D. Vickers, all of Akron, O., U.S.A.

442,62. **New Composition of Matter Including an Interpolymer of Isobutylene with a Diolefin, together with Polyisobutylene.** Standard Oil Development Co., Linden, assignee of P. K. Frolich, Westfield, and I. E. Lightbown, Elizabeth, all in N. J., U.S.A.

442,963. **Composition of Matter Including a Low-Temperature Olefin-Diolefin Interpolymer, together with Polyethylene.** Standard Oil Development Co., Linden, assignee of N. S. Beekley, Jr., Westfield, both in N. J., U.S.A.

442,974. **Preparing a Refined Solution of a Resin-Forming Unsaturated Light Oil Hydrocarbon.** United Gas Improvement Co., Philadelphia, assignee of F. J. Soday, Swarthmore, both in Pa., U.S.A.

442,975. **Polymerizing Soluble Polycyclopentadiene with Monomeric Ring-Substituted Methyl Styrene.** United Gas Improvement Co., Philadelphia, assignee of F. J. Soday, Swarthmore, both in Pa., U.S.A.

442,976. **Polymerizing Soluble Polycyclopentadiene with Monomeric Styrene.** United Gas Improvment Co., Philadelphia, assignee of F. J. Soday, Swarthmore, both in Pa., U.S.A.

442,977. **Alpha-Beta-Dichloro-Meta-Tolylethane.** United Gas Improvement Co., Philadelphia, assignee of F. J. Soday, Swarthmore, both in Pa., U.S.A.

442,980. **Conducting Exothermic Polymerization Reactions.** United Gas Improvement Co., Philadelphia, Pa., assignee of F. J. Soday, Baton Rouge, La., both in the U.S.A.

442,987. **Purification of a Light Oil Methyl Styrene Fraction.** United Gas Improvement Co., Philadelphia, assignee of C. W. Jordan, Paoli, both in Pa., U.S.A.

442,982. **Polymerization of Heat Polymerizable Olefins by Heating at Temperatures below 200° C. by Radiation, the Major Portion of Which Consists of Infra-Red Rays of Wave Length from 10,000 to 20,000 Angstrom Units.** United Gas Improvement Co., Philadelphia, Pa., assignee of F. J. Soday, Baton Rouge, La., both in the U.S.A.

442,983. **Separating Butadiene into More Concentrated Form from a Hydrocarbon Mixture Containing Butadiene and Butylene.** United Gas Improvement Co., Philadelphia, assignee of N. K. Chaney, Moylan, both in Pa., U.S.A.

442,984. **Fractional Distillation of Styrene in the Presence of Oxygen and a Polymerization Inhibiter.** United Gas Improvement Co., Philadelphia, assignee of R. A. Franz, Wallingford, both in Pa., U.S.A.

United Kingdom

589,045. **Low-Temperature Polymerization of Olefins.** J. C. Arnold (Standard Oil Development Co.).

589,065. **Unsaturated Polymerization Products.** E. I. du Pont de Nemours & Co., Inc., and J. R. Roland.

589,073. **Vulcanized Compositions.** Standard Oil Development Co.

589,076. **Plastic Composition.** I. Shamah.

589,131. **Adhesives.** Libbey-Owen-Ford Glass Co., and A. M. Howald.

589,167. **Fluorinated Derivatives of Aliphatic Hydrocarbons.** Imperial Chemical Industries, Ltd., and W. B. Whalley.

589,197. **Vinyl Fluoroacetates and Polymers thereof.** E. I. du Pont de Nemours & Co., Inc.

589,248. **Rubber-Like Synthetic Materials.** J. C. Arnold (Standard Oil Development Co.)

589,249. **Latex Treatment.** Wingfoot Corp.

589,264. **Polymeric Materials.** Imperial

Accelerators
Plasticizers
Antioxidants

A Complete Line of Approved Compounding Materials

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL. • SAN FRANCISCO, CALIF.

Chemical Industries, Ltd., D. Brundrit, and J. A. D. Hickson.

589,292. **Formaldehyde.** E. I. du Pont de Nemours & Co., Inc., W. F. Brondyke, and J. A. Monier, Jr.

589,337. **Polymerization Process.** Distillers Co., Ltd., J. J. P. Staudinger, and M. D. Cooke.

589,342. **Aromatic Amines.** J. C. Arnold (Standard Oil Development Co.).

589,353. **Rubber-Like Polymers.** J. C. Arnold (Standard Oil Development Co.)

589,360. **Halogen-Containing Polymers and Interpolymers.** E. I. du Pont de Nemours & Co., Inc.

589,380. **Alcohol of High Molecular Weight.** Soc. Anon. d'Innovations Chimiques Dite: Sinnova ou Sadic.

589,392. **Low-Temperature Polymerization of Olefinic Material.** C. Arnold (Standard Oil Development Co.).

589,426. **Treatment of Effluent from a Hydrocarbon Oil Catalytic Cracking Operation.** J. C. Arnold. (Standard Oil Development Co.).

589,434. **Process for Copolymerization of Styrene and/or Homologs thereof.** Standard Oil Development Co.

589,465-466. **Aryl Derivatives of Trichlorethane.** Imperial Chemical Industries., Ltd.

589,499. **Rubber-Like Products.** E. I. du Pont de Nemours & Co., Inc.

589,501. **Chlorinated Quinones.** United States Rubber Co.

589,515. **Dinitroparaffins.** Imperial Chemical Industries, Ltd., A. Lambert, and A. Lowe.

589,547. **Recovery of Ethylene Oxide from Dilute Aqueous Solutions.** Distillers Co., Ltd., and F. J. Wilkins.

589,568. **Treatment of n-Alkoxymethyl Polyamides.** E. I. du Pont de Nemours & Co., Inc.

589,574. **Electrically Semi-Conducting Coating.** Allmanna Svenska Elektriska, A. B.

589,577. **Interpolymers of Vinylidene Fluoride.** E. I. du Pont de Nemours Co., Inc.

589,625. **Pyridine and Piperidine Compounds.** Soc. of Chemical Industry in Basle.

589,636. **Compounding Natural and Synthetic Rubber.** Permanente Metals Corp.

589,654. **Synthetic Resin Coating Compositions.** J. Sankey & Sons, Ltd., and G. W. Stockton.

589,695. **Synthetic Resinous Condensation Products.** British-Thomson-Houston Co., Ltd.

589,701. **Synthetic Resinous Materials.** Portland Plastics, Ltd., S. A. Leader, and J. J. Gordon.

589,709. **Manufacture of Olefins and Diolefins by Catalytic Dehydration.** Usines de Melle.

589,714. **Articles Consisting Essentially of a Polymer of Tetrafluoroethylene.** Imperial Chemical Industries Ltd.

589,715. **Polyvinyl Chloride Compositions.** Imperial Chemical Industries, Ltd., and L. B. Morgan, P. Russell, R. A. Kinnear, and R. G. Heyes.

589,716. **Tri-Amino-Monocyclic Aromatic Hydrocarbons.** Imperial Chemical Industries, Ltd., W. E. Tetlow, A. McLean, and J. Munro.

589,730. **Benzenesulfonyl Thiourea Derivatives.** Soc. Des Usines Chimiques Rhone-Poulenc.

589,795-796. **Activation of Catalysts.** Imperial Chemical Industries, Ltd.

MACHINERY

United States

2,423,147. **Apparatus for Manufacturing Inner Tubes.** D. R. Hinman, Indianapolis, Ind., assignor to United States Rubber Co., New York, N. Y.

2,423,914. **Hydraulically Driven Injection Molding Press.** C. W. Wacker, Cincinnati, O., assignor to Clearing Machine Corp., Chicago, Ill.

2,424,177. **Tensile Tester.** W. D. Lawshe and W. A. Gardiner, assignors, by mesne assignments, to Monsanto Chemical Co., all of Seattle, Wash.

2,424,426. **Means for Making Elastic Coil Cables.** R. J. Arnold, Western Springs, assignor to Kellogg Switchboard & Supply Co., Chicago, both in Ill., and to R. D. Collins, Beverly Hills, Calif.

2,424,445. **Machine to Coat and Open Flexible Tubing and Wipe Excess Coating Material therefrom.** J. Frier, Webster Groves, Mo.

United Kingdom

589,046. **Film Shaping and Laminating Devices.** A. Marks.

589,753. **Vulcanizer for Hollow Tubular Articles.** Dunlop Rubber Co., Ltd., and H. Willshaw.

UNCLASSIFIED

United States

2,423,195. **Clip for Flexible Tubes.** E. Longden, Greenside, Johannesburg, Transvaal, Union of South Africa.

2,423,632. **Renewable Hose Coupling.** L. E. Ansorge, assignor to Eastman Mfg. Co., both of Manitowoc, Wis.

2,423,652. **Tire Remover.** M. B. Kelley, Washington Pa., assignor, by mesne assignments, to Kel-Mar Tire Remover Co., Pittsburgh, Pa.

2,423,827. **Tennis Ball Cover Cloth Formed Partly of Wool Cloth and Partly of Nylon Fibers.** Z. J. Chagnon, Delmar, assignor to Albany Felt Co., Albany, both in N. Y.

2,424,008. **Cable Rack.** A. J. Wayman, Youngstown, O.

2,424,067. **Cable Sealing and Clamping Device.** R. E. Thoren, Seattle, Wash.

2,424,478. **Cross-Chain for Tire Anti-Skid Chains.** R. C. Mason, Pittsburgh, Pa.

Dominion of Canada

441,629. **Closure Cap for Fuel Tank.** Variety Aircraft Corp., assignee of F. D. Paine, both of Dayton, O., U.S.A.

442,533. **Pipe Joint.** M. E. Alexander, West Orange, N. J., U.S.A.

442,623. **Hand Tool for Stripping Insulation from Wire.** International Standard Electric Corp., New York, N. Y., assignee of F. Fairley and A. C. Delamare, both of London, England.

442,845. **Tire Tool.** F. E. Simmons, New Orleans, La., U.S.A.

442,956-957. **Adhesive Tape Dispenser.** Seamless Rubber Co., New Haven, assignee of P. S. Madsen, Bethany, both in Conn., U.S.A.

United Kingdom

589,200. **Overall Chains for Road Vehicle Wheels.** E. A. Dennison.

589,333. **Wheel Suspension of Ammunition Wagons and Limbers or Trailer Wagons for Road Vehicles.** N. Straussler.

589,362. **Apparatus to Test Wheel Alinement.** Dunlop Rubber Co., Ltd., J. H. Hardman, and F. R. Carr.

589,431. **Band or Hose Clips.** W. E O'Shei.

589,432. **Connectors to Join Braided Electric Cables.** H. E. Holman.

589,611. **Mounting Arrangement for Adhesive Articles.** Scholl Mfg. Co., Ltd. (W. M. Scholl).

589,690. **Cable Clamps, Etc.** United-Carr Fastener Corp.

TRADE MARKS

United States

430,909. **Dunlop Pillo-Foam.** Cushions, pads, etc. Dunlop Tire & Rubber Corp., Buffalo, N. Y.

430,923. **Stymer.** Synthetic resins. Monsanto Chemical Co., St. Louis, Mo.

430,938. Representation of an oblong containing the word: **"Mastercord."** Electric cords. Kellogg Switchboard & Supply Co., Chicago, Ill.

430,975. Representation of a shield containing the words: **"Black Shield CD."** Carbon black dispersion. Carbon Dispersions, Inc., Newark, N. J.

431,067. **Filfloc.** Cotton flock. Rayon Processing Co. of R. I. Inc., Central Falls, R. I.

431,172. Representation of a circular trade mark with the words: **"Nedmac Frank Groves Company San Francisco."** Mechanical rubber goods. F. Groves, doing business as Frank Groves Co., San Francisco, Calif.

431,173. **Nedmac.** Mechanical rubber goods. F. Groves, doing business as Frank Groves Co., San Francisco, Calif.

431,174. Representation of a circular trade mark with the words: **"Nedmac Frank Groves Company San Francisco FG Co."** Mechanical rubber goods. F. Groves, doing business as Frank Groves Co., San Francisco, Calif.

431,185. **Plaspreg Resin.** Liquid resins. Furane Plastics & Chemicals Co., Los Angeles, Calif.

431,188. **Nylaflex.** Tire repair patches. Morgan Tire Co., doing business as Morgan, Cincinnati, O.

431,189. **Challenge.** Syringes and hot water bottles. Faultless Rubber Co., Ashland, O.

431,190. **Endurance.** Syringes and hot water bottles. Faultless Rubber Co., Ashland, O.

431,191. **Reliance.** Syringes, hot water bottles, etc. Faultless Rubber Co., Ashland, O.

431,244. **Dualay.** Cable. Okonite Co., Passaic, N. J.

431,259. **Diplomat.** Tires and tubes. United States Rubber Co., New York, N. Y.

431,261. Representation of a semi-circular trade mark containing the words: **"Okonite-Callender."** Wire and cable. Okonite Callender Cable Co., Inc., Paterson, N. J.

431,273. **Koroseal.** Tape. B. F. Goodrich Co., Akron, O.

431,276. **Genecatel.** Wires and cables. General Cable Corp., New York, N. Y.

431,288. Representation of an oblong containing a representation of a lamb. Prophylactic articles. Youngs Rubber Corp., New York, N. Y.

431,294 Representation of a fish containing the word: **"Webbys."** Swimming device. Hal Messinger Associates, Inc., Tampa, Fla.

431,295. **A. G. Spalding & Bros.** Baseballs. A. G. Spalding & Bros., Inc., Chicopee, Mass.

431,353. **Plastikwear.** Rainwear, aprons, etc. Atlantic Plastikwear Fashions, Inc., New York, N. Y.

431,361. **Industrial Hose Reporter.** Monthly publication. Gates Rubber Co., Denver, Colo.

431,371. **Ritestart.** Footwear. Dr. A. Posner Shoes, Inc., New York, N. Y.

431,389. **Peroxiplastic.** Polyvinyl resin sheets or films. R. S. Harte, San Francisco, Calif.

431,421. **Bilnor.** Inflatable pillows. Electronic Appliances Corp., Bronx, N. Y.

431,469. **SlumberAir.** Pillows. Interstate Latex Co., Youngstown, O.

431,487. **Douglas Tugs.** Footwear. W. L. Douglas Shoe Co., Brockton, Mass.

431,489. Representation of an oblong containing representations of four figures and the word:**"Heyday."** Footwear. Victory Shoe Co., St. Louis, Mo.

431,518. **Dr. Denniston Shoe Famous For Comfort-Correction Style.** Footwear. Dyer's Shoe Stores, Inc., Madison, Wis.

431,520. **American Nurse.** Footwear. American Girl Shoe Co., Boston, Mass.

Foreign Trade Opportunities

The firms and individuals listed below have recently expressed their interest in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

I. Buchanan Scott, Great Eastern House, 154 Bishopsgate, London, E. C. 2, England: general merchandise, toys, textiles, rubber goods, plastics.

Etablissements Mallat, 53 Blvd. de Strasbourg, Paris (Xème). France: plastic materials, pigments for rubber erasers.

A. G. E. S. (Anonima Gomma Ebanite Similari), 40 Via Andorno, Turin, Italy: natural and synthetic rubber, rosin (rubber grade), carbon black (lamp black) for rubber compounding.

Calzature Colombino, 21 Via Cesare Balbo, Turin, Italy: tennis shoes, rubber boots and overshoes.

Ahmet Anver Yelkenci, representing Sark Ticaret Kollektif Sirketi, 12/14 Merkez Han, Galata, Istanbul, Turkey: chemicals, rubber goods.

Fibrocit S.A., 26 Rue Masui, Brussels, Belgium: sponge rubber for stuffing spring seats.

Y. Renon-Richerod, 33 Avenue Leon Gambetta, Montrouge (Seine), France: reclaimed rubber, latex, vinyl chloride and vinyl chloride copolymers, vinylidene, plastics, silicons.

Cobelshoe, 28 Rue du Cap Crespel, Brussels, Belgium: waterproof rubber footwear.

K. N. Chakravarty, representing Kamalalaya Stores, Ltd., 156 Dharamtolla St., Calcutta, India: textile goods of all types, rubber goods, plastics articles, machinery, chemicals.

Kader Siddik Corp., Ltd., 2 Oxford Bldg., Connaught Circus, New Delhi 1, India: first-quality fountain pens, rubber goods.

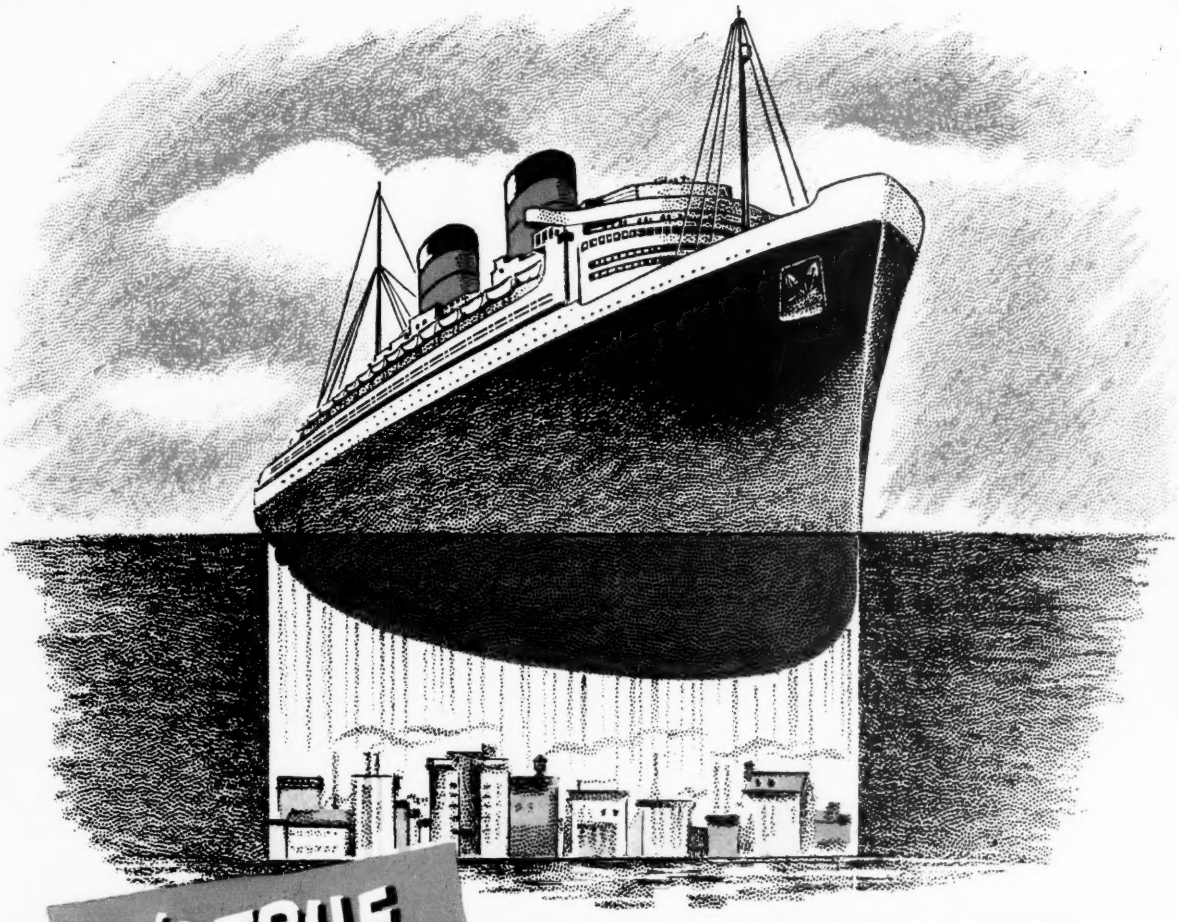
J. L. Clark & Co., P. O. Box 7787, Johannesburg, Union of South Africa: pencils, fountain pens, erasers, general stationery lines.

Sociedade Productos Phenix Ltda., Rue Anna Nery No. 980, Sao Paulo, Brazil: pharmacists' supplies, as adhesive tape, hot water bags, ice bags, tubes, etc.

R. L. and D. A. Pinker and C. W. Clark, representing Harris Langton, Ltd., 428 Queen St., Auckland, New Zealand: materials and machinery for rainwear factories.

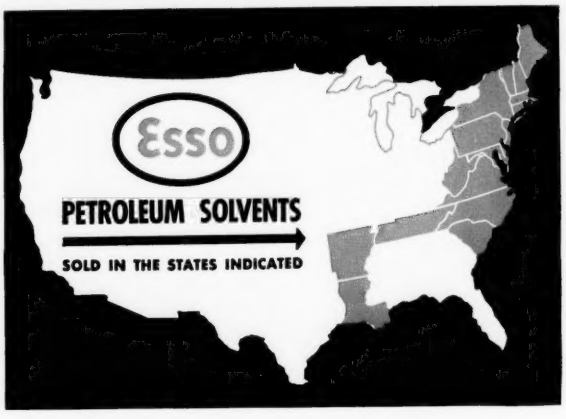
Alexis Khoury, P. O. Box 411, Khan Katana, representing Hajj, Khoury & Co. and Syrian Trading Co., P. O. Box 280, both of Damascus, Syria: tires and tubes, refrigerators, radios, yarns, textiles.

(*Continued on page* 846)



IT'S TRUE...

THE LINER QUEEN ELIZABETH DISPLACES ABOUT THE SAME AMOUNT OF WATER THAT THE CITY OF BALTIMORE, MD. USES IN A DAY!



STANDARD OIL COMPANY OF NEW JERSEY
Elizabeth, N. J.—Baltimore, Md.—Richmond, Va.—Charleston, W. Va. Charlotte, N. C.—Columbia, S. C.—New Orleans, La.—Little Rock, Ark. Memphis, Tenn.

STANDARD OIL COMPANY OF PENNSYLVANIA
Philadelphia, Pa.

COLONIAL BEACON OIL COMPANY
Boston, Mass.—New York, N. Y.

IT'S TRUE OF ESSO SOLVENTS

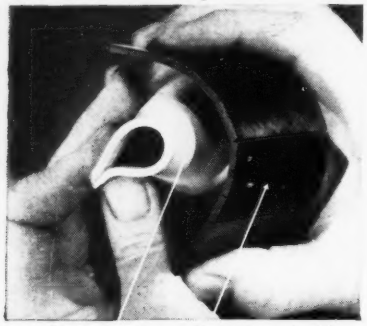
THE TOTAL GALLONAGE OF **ESSO SOLVENTS** SOLD LAST YEAR WOULD FLOAT ALMOST 5 SHIPS THE SIZE OF THE QUEEN ELIZABETH!

Careful manufacturing control is the important factor in the production of Esso Petroleum Solvents. In this way we maintain the correct combination of physical attributes in any specific solvent. Hundreds of industries depend on the constant suitability and uniformity in solvents that the Esso trademark assures. See your Esso Representative next time you order.

Silicone News

DC

SILASTIC* stays ELASTIC!



Silastic after 68 days at 300° F. | Synthetic organic rubber after 1 day at 300 °F.

We've been talking for some time about the exceptional stability of Silastic, the Dow Corning Silicone Rubber. We've proved it in many applications where extremes of temperature caused the most stable of organic synthetic rubbers to fail in a few hours or a few days. But it's still hard to believe that there is now available an entirely new kind of rubber-like material useful at temperatures far above and below the limits of any organic rubber.

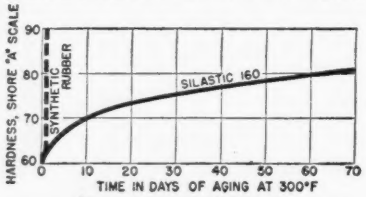
This column of new data will give you a better idea of how heat-stable Silastic really is. You may remember a previous column giving brittle points ranging from −70 to −100° F. for the same Silastic stocks. It's more than a slogan—Silastic stays elastic in oven heat or arctic cold.

Effect of Aging at 300° F.

Test Sample	Weight Loss, %	Shrinkage, %	Decrease in Elasticity, %
Silastic 160 after 61 days	2.8	2.6	12
Synthetic Rubber[1] after 1 day	8.6	3.5	75

[1] One of the most heat-stable synthetic organic rubbers.

The increase in the hardness of Silastic 160 compared with one of the most heat resistant of the synthetic organic rubbers is shown in the graph below. Silastic is described in leaflet No. U21-2.



*TRADE MARK DOW CORNING CORPORATION

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

New York • Chicago • Cleveland • Los Angeles
In Canada: Fiberglas Canada, Ltd., Toronto
In England: Albright and Wilson, Ltd., London

Dow Corning

FIRST IN SILICONES

Dow Corning Silicone Products include

FLUIDS
- Damping
- Hydraulic
- Dielectric
- Waterproofing
- Lubricating
- Diffusion Pump
- Mold Release

GREASES
- High Temperature
- Low Temperature
- Valve Lubricants
- Stopcock
- High Vacuum

COMPOUNDS
- Ignition Sealing
- Antifoam A

RESINS
- Electrical Insulating
- Laminating
- Protective Coatings

SILASTIC*
- Molding
- Extruding
- Coating
- Laminating

*Trade Mark Dow Corning Corporation

New Machines and Appliances

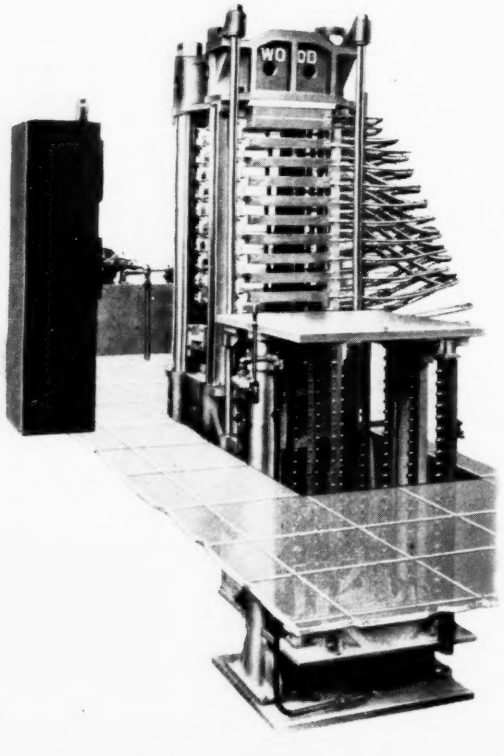
Press Production Unit

A PRECISION type of platen press that is a complete sheet production unit has been developed by R. D. Wood Co., Independence Square, Philadelphia 5, Pa. The unit includes a 285-ton press with a loading and unloading elevator, a two-pressure unit for operation of press and elevator, and an automatic valve control system with complete automatic adjustable control of press operating cycle (including pressure application and regulation of platen temperature), with all controls centralized in a panel board at the operator's station.

The press has been designed especially for laminating and polishing plastic sheets. It provides the positive pressure and temperature controls required for the repetitive production of exactly uniform sheets 0.003- to 0.075-inch thick, in compliance with the most rigid specifications for thickness, uniformity, coloring, and flexibility.

Heating platens are of the double-labyrinth type, thermostatically controlled, and provide two separate steam and cooling water circuits for uniform heating and cooling. The elevator has 20 openings, just twice the number of openings in the press. The sandwiches (alternate sheets and caul plates) are rolled into alternate openings of the elevator cage on needle-bearing rollers. The elevator is then raised to the point where the empty alternate sets of rollers line up with the rollers in the press openings, and the cured sheets are rolled from the press into the elevator. Unprocessed sandwiches are then rolled into the press, completing the unloading and the loading operations with a minimum of idle-press time. While the sheets are being cured, the elevator is lowered, the finished sheets are unloaded, and new sandwiches added.

The press pressure and operating cycle, together with heating and cooling phases, are completely controlled from the press



Wood Sheet Press Unit with Loading and Unloading Elevator

now available in larger quantities

Piccoumaron

a Series of Para–Coumarone Indene Resins

now available
in flake form as well as solid

Expanded manufacturing facilities have made available larger supplies of PICCOUMARON RESINS. Prices remain at about pre-war levels.

Piccoumaron Resins are furnished in ten standard melting points, varying from liquids to brittle solids.

Write for complete details.

now shipped in
correct type of steel drums

prices remain
at about pre-war levels

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
CLAIRTON, PENNSYLVANIA

Plants at Clairton, Pa. and Chester, Pa.

Makers of: Coumarone Resins · Coal Tar Solvents · Styrene Resins · Rubber Plasticizers · Reclaiming Oils · Terpene Resins · High Solvency Naphthas · Solvent Oils.

Distributors to the Rubber Industry
HARWICK STANDARD CHEMICAL CO.
Akron 8, Ohio

PICCO

No, lock the door *before* it's stolen. In this case, "it" means accuracy, production and profit. . . . Since 1927 the Schuster Magnetic Calender Gauge has consistently served four important ends:

1. It assures uniform thickness in your finished product, down to 1/1000".
2. It makes hand-miking unnecessary, saving time and expense.
3. It does away with the human equation, *preventing* mistakes.
4. It saves the stock sampled for calender testing.

The Schuster Gauge does these things by the simple expedient of setting rubber calender rolls to a desired thickness and holding them there. More lately, it has showed itself just as indispensable as "insurance" to synthetic rubber, plastics, cellulose and other materials. The instrument is simple in design, rugged in construction, practically without wearing parts, and adjustable to any thickness.

There is no "stock recipe". Every installation must be engineered to the job. May we tell you what the Schuster Magnetic Calender Gauge can do for you?

Ask for our Bulletin "W"

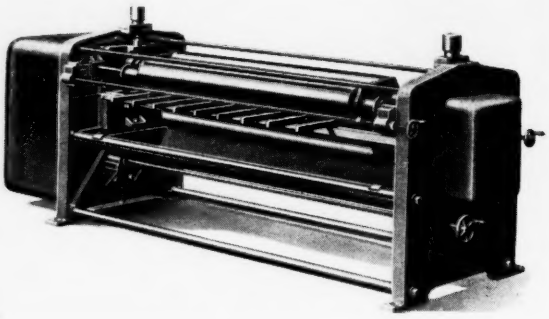
THE MAGNETIC GAUGE COMPANY
60 EAST BARTGES STREET AKRON 11, OHIO

—SALES REPRESENTATIVES—

Eastern
BLACK ROCK MFG. CO.
Bridgeport, Conn

Western
H. M. ROYAL
Los Angeles Calif.

panel board through adjustment of time-pressure and time-temperature cam controllers. The panel board also has a combination temperature and pressure recorder. The presses can be built in a wide range of sizes for varying pressures.



Columbia Roll Coating Machine

Improved Roll Coater

A MORE uniform spread of adhesive, sizing, wax, paint, or lacquer on flat surfaces is claimed for the new Columbia roll coating machine, made by the Columbia Machinery & Engineering Corp. This uniformity is achieved through the use of larger diameter (10-inch) coating rolls which reduce the angle of departure of the rolls from the work. The rolls are driven through universal joints, providing a positive drive without chatter.

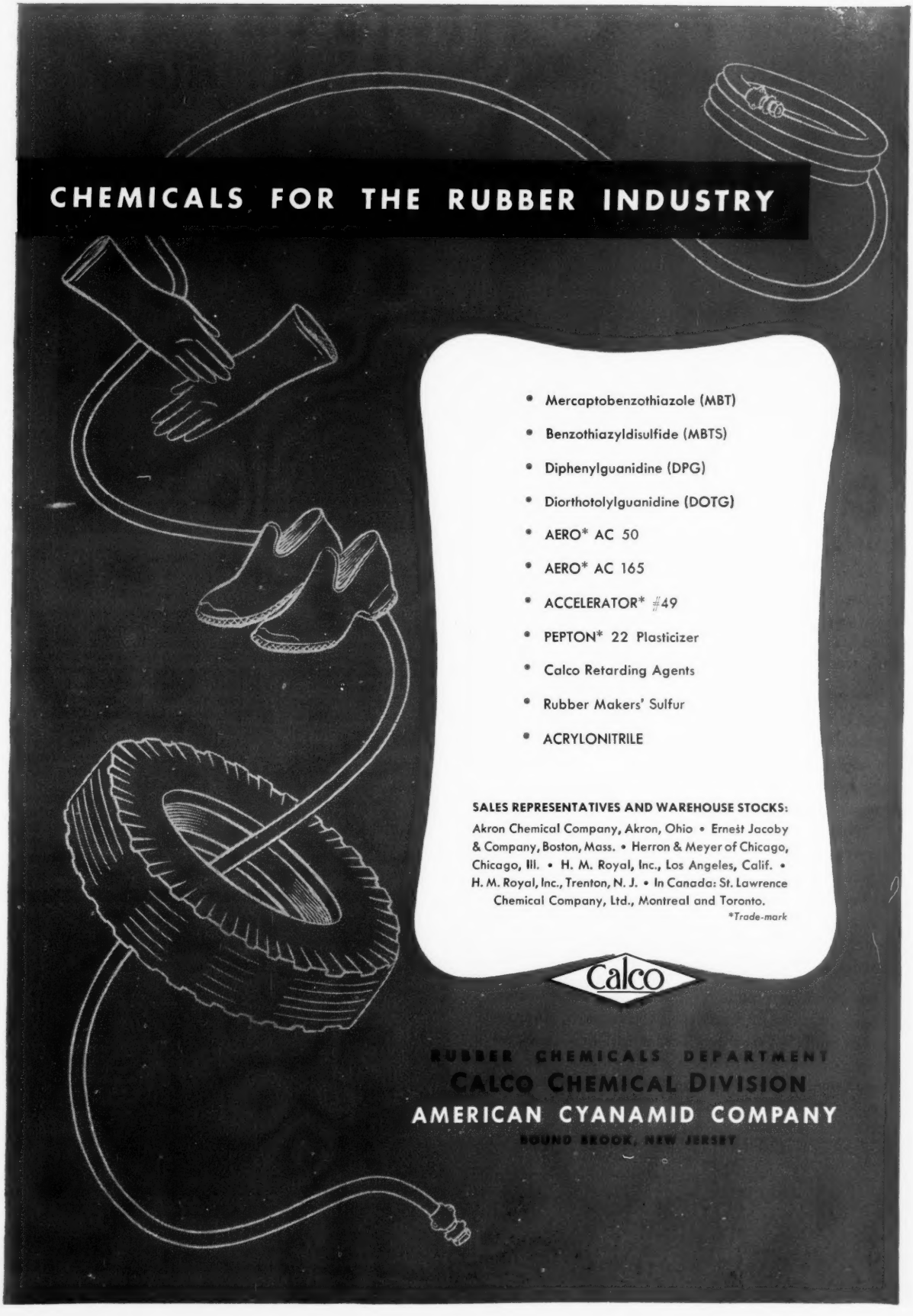
Better distribution of the coating material is also claimed through the use of variable-speed drive of the eight-inch hard rubber doctor rolls which permits them to operate at a slower speed for precision application of the coating film and more accurate control of the spread depth. Larger diameter doctor and coating rolls form a larger crotch with correspondingly greater coating material capacity. Chrome plated seal plates at each end contact the babbit-faced roll ends and provide a perfect seal.

Long clearance at both ends of the rolls minimizes the possibility of damage to bearings and facilitates cleaning. Rolls are readily removed for replacement when needed. The seal plates are held in place by spring collars and can be removed for cleaning without taking out any bolts or screws.

All adjustments are rapidly and accurately made by means of handle-type adjusting wheels operating through a screw mechanism. The off-bearing table consists of a number of pick-up fingers which can be adjusted to insure correct pick off of any material from the coating rolls. The motor, gear reduction, and transmission are protected by a heavy stamped metal housing. There are no exposed gears or moving parts other than the rolls, and downward pressure on the safety bars instantly stops the rolls.

The coaters are made in four types for coating tops, bottoms, or both sides of the work. They will coat any type of material, including rubber, plastics, paper, cardboard, fiberboard, fabrics, plywood, etc., in sheets from 36 to 96 inches wide and in any thickness up to four inches. Coating rolls can be furnished in any width from 38 to 98 inches, with coverings suitable for use with the different types of coating materials. Larger or smaller machines can be furnished on special order. Either variable or constant speed motor drives can be supplied, and circulating pumping units for the coating material and water-cooled glue storage reservoirs can be furnished where desired.

"1946 A.S.T.M. Standards. Parts III-A and III-B, Nonmetallic Materials." American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Part III-A, 1290 pages. Part III-B, 1360 pages. This edition of standards on nonmetallic materials is the first to appear in two volumes. Volume III-A covers fuels, petroleum, aromatic hydrocarbons, soaps, water, and textiles; while Volume III-B deals with electrical insulation, plastics, rubber, paper, shipping containers, and adhesives. The section on plastics includes some 117 standards; while about 70 standards comprise the section on rubber.


CHEMICALS FOR THE RUBBER INDUSTRY
• Mercaptobenzothiazole (MBT)
• Benzothiazyldisulfide (MBTS)
• Diphenylguanidine (DPG)
• Diorthotolylguanidine (DOTG)
• AERO* AC 50
• AERO* AC 165
• ACCELERATOR* #49
• PEPTON* 22 Plasticizer
• Calco Retarding Agents
• Rubber Makers' Sulfur
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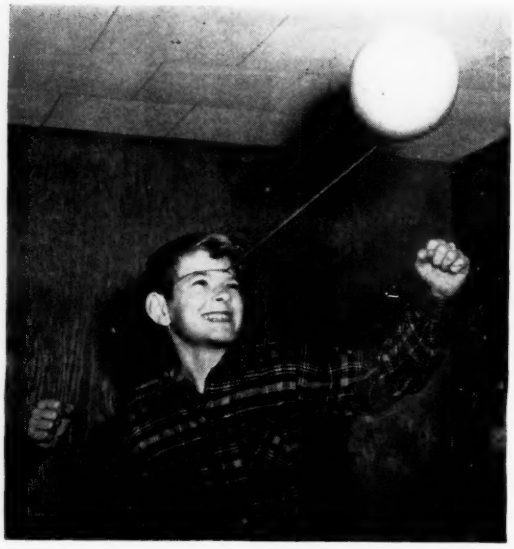

Molded Latex Products' Joy Punching Ball

Novel Punching Ball

THE Joy Punching Ball, designed to provide a new form of safe fun and beneficial exercise for future "champs," was recently introduced by Molded Latex Products, Inc. The ball incorporates a seamless, inflatable rubber punch-ball seven inches in diameter, with a firmly attached elastic return cord which fits comfortably around the forehead or can be held in the hand.

When punched or slapped out from the body, the tension of the return band causes the ball to fly back to the person. The skill required to strike the ball repeatedly as it returns is said to be easily and quickly acquired by youngsters and adults alike. The punching ball is ideal for fun in the home, school gymnasium, at the beach, or the playground, in fact, anywhere that active fists and alert young minds want safe and stimulating action.

The brightly colored one-piece ball is made of long-lasting neoprene latex. Tough, durable, and designed to absorb the most punishing blow, it is yet so light and soft that it cannot harm the novice who misses a punch. The ball features a patented valve that eliminates the usual bulge caused by conventional inflating stems, and a return cord that cannot break free from the ball.

FOR MARVELOUS ABRASION RESISTANCE—
PHILBLACK-O

FOR FURTHER DETAILS, SEE AD ON PAGE 728

What Does the Future Hold for Plasticizer Developments?

In three short years, the pioneering research of The Resinous Products & Chemical Company has resulted in basically new plasticizers for vinyl resins and elastomers which have revolutionized compounding and enlarged the use for these products. Typical of these new plasticizers now in tonnage production and widespread use are the following:

1944 PARAPLEX G-25

The first truly non-migratory, completely permanent plasticizer for vinyl resins.

1945 PARAPLEX G-40

A low-cost, solvent-resistant, polymeric plasticizer which complements PARAPLEX G-25.

1946 MONOPLEX DOS
(Dioctyl Sebacate)

The ultimate in monomeric plasticizers, characterized by outstanding low-temperature flexibility, high efficiency and excellent permanence.

1947 MONOPLEX 11

An ester-type monomeric plasticizer with high efficiency and an unusual compatibility range.

1947 MONOPLEX 16

A high molecular weight, nitrile-type which provides unusual durability and permanence in vinyl compounds at low cost.

The establishment and acceptance of MONOPLEX 11 and 16 in 1947 only point up the fact that despite the intensive research of the past several years, the next few years will bring forth many new and important developments. Continuation of this development work will result not only in new and different plasticizers, but also in quality improvements in standard products. Greater manufacturing efficiency and production capacity will be reflected in lower prices to our customers.

What is the future of plasticizer developments? No one can answer, but, in a changing and expanding field the wise formulator will want to be in a position to use the versatile PARAPLEX and MONOPLEX plasticizers of the present and the future. Look to Resinous Products for leadership!

PARAPLEX *is a trade-mark, Reg. U.S. Pat. Off.*

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pigments for the rubber industry

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59 plants located in 27 states give Eagle-Picher's activities a national scope. Strategic location of plants and extensive production facilities enable Eagle-Picher to serve industry with increased efficiency... we manufacture a comprehensive line of both lead and zinc pigments for the rubber, paint and other process industries.

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Promoter Babe Culnan Examines Cellular Rubber Ring Mat

Rubber Mat for Boxing Rings

A SOFT cellular rubber mat to protect boxers from head injuries was recently installed at the Meadowbrook Outdoor Bowl, Newark, N. J., and ring officials hailed it as an important step forward in preventing future boxing fatalities. The mat, one inch thick, was placed under the regular ring canvas. The rubber, made by United States Rubber Co., Rockefeller Center, New York 20, N. Y., had its resilience dramatically demonstrated recently when fresh eggs were dropped on it without breaking from the roof of an 11-story building. Babe Culnan, a Newark boxing promoter, started experimenting with the ring mat after seeing pictures of the egg-dropping stunt. He declared that the mats have successfully passed all tests and predicted that they would soon be installed in boxing rings throughout the country.

Koroseal Wading Pool

PLAY POND, a new folding wading pool for children, has been announced by The B. F. Goodrich Co., Akron, O. Made of Koroseal flexible sheet, the pool has heat-welded seams and extra heavy bottom and sides to withstand long use under all types of summer weather. When full, the pool is shaped like a giant doughnut and has no metal frames or rigid supports to cause injuries. When filled with water, it forms a circular pool seven feet in diameter and six to nine inches deep.

There are no tricky set-up details and no accessory parts to become lost. To fill, the Play Pond is spread out with the trade mark facing up, and the rim partially inflated by blowing into an air tube located on the inside of the rim. No cork or cap is needed to close the air tube as water pressure prevents escape of air when the pond is full. The pool is then filled with water, and the air trapped in the rim keeps the rim rising an inch or two above the water level. The sides of the pool rise and fall with the water level as children move about, a feature which helps prevent spillage of water. To empty the pond, a side is held down and the water allowed to run out.

Repair material is furnished with each pond, and patches can readily be applied. The pond is light in weight and can be folded into a neat package for storing purposes.

Goodrich's New Play Pond

LITTLEJOHN & CO., Inc.

120 WALL STREET

NEW YORK 5, N. Y.

CRUDE & SYNTHETIC RUBBER

NATURAL & SYNTHETIC LATEX

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All Grades of
Brazilian & Far Eastern
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EUROPE

FRANCE

Plastics Conference at Lyons Fair

On the occasion of the Lyons International Fair, held April 12-21, 1947, a one-day conference on the progress in the manufacture and application of plastics was organized for April 19, under the auspices of the Institut de Chimie Industrielle de Lyon, by a group of manufacturers consisting chiefly of the most important French chemical concerns, including: Etablissements Kuhlmann; Société Alais, Froges et Camargue; Société Alsthom; Société Francolor; Etablissements Lacollonge; Manufacture Lyonnaise du Caoutchouc; Etablissements Marechal; Société Rhodiaceta; Société Rhone-Poulenc; Société R.V.A.; and Compagnie de St. Gobain. Altogether seven papers were presented which have been assembled in a single publication of 114 pages.

"Aminoplast Resins," by A. Durr, of the Société Francolor, covered various resins that come under this head, indicating the forms under which they are obtainable and their applications. France's prewar output of these materials included from 500 to 600 tons per annum of aminoplast molding powders, and 200 tons of adhesives. Because of shortages of urea, present outputs are 1,000 tons per annum of molding powders against requirements put at 5,000 tons, and 4,000 tons of adhesives, against a demand estimated at 6,000 to 8,000 tons.

"Chlorinated Rubber," by Pierre Henry, of Société Alais, reviewed the history, properties, and most important uses of the product. M. Henry pointed out that in a period when natural rubber was meeting competition from synthetics in practically every field, the production of chlorinated rubber still provided an assured, if small outlet for natural rubber. The writer recalled that the British were the first to produce chlorinated rubber (Duroprene), and that this was the only chlorinated rubber on the market from its first appearance in 1916 to 1930 when the New York Hamburger Gummiwaren concern in Hamburg put out its Tornesit. This was quickly succeeded by Pergut, of the I. G. Farben, Tegofan, of the Chemische Fabrik, Buckau, and Dartex, of the Metallgesellschaft, in Germany; Alloprene, of the Imperial Chemical Industries, Ltd., England; Parlon, of Hercules Powder Co., in the United States; Pechiney, of the Cie. Allais, Froges et Camargue, in France; Clortex, of the Societe Electrique et Electrochimique, of Caffaro, Italy; and Aizen, of the Hadogaya Soda K.K., and Nippon, of the Nippon Soda K.K., in Japan.

In **"Pastes Based on Polyvinylchloride,"** by M. Chazal, of the Société Rhone-Poulenc, of St. Fons (Rhone), the author mentions that pastes of this kind had been used on a very large scale in Germany since 1938 and during the war. He points out that under existing conditions in France today, the simplicity of the apparatus needed and of application, as well as the variety of objects that can be made from these pastes, should make them especially attractive to French manufacturers, and they should consequently find a wide use here in France.

"Lucoflex, Rigid Material Based on Polyvinyl Chloride," by Marcel Sans, of the St. Gobain concern, revealed that the Germans began to use a similar material in 1938. This form of polyvinyl resin is said to be particularly useful for providing protective surfacing or for manufacturing various kinds of objects and equipment used in the chemical industry and in chemical laboratories. Lucoflex is claimed to resist water, saline solutions, except permanganate of potash, all bases, all acids at all concentrations and at temperatures to 40 and 60° C. and in some cases even up to 80° C. (except hydrofluoric acid, concentrated nitric acid and oleum); it is impermeable to all dry and moist gases, except chlorine and nitrogen oxides; indeed it is classed among the least permeable of the plastic materials; it also resists organic acids, except concentrated formic and acetic acids; it is less resistant to organic solvents.

In **"The Plastic Applications of Superpolyamides,"** Paul Mingat, of Société Rhodiaceta, briefly discussed methods and apparatus for producing extrusions of different kinds, castings, coatings for fabrics, varnishes and glues, and their applications.

According to **"Applications of Plexiglas Methacrylic Resins,"** by C. R. de Villeneuve, of the Société Alsthom, France started manufacturing Plexiglas for airplanes in 1935 so that by 1939-40 she was in a position to equip all domestic planes

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Continuing research and development in our laboratory and rigid production control has made us the leader in this field.

The services of our laboratory are at your disposal in solving your compounding problems.

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Hundreds of Designs

Scores of standard tools in stock for working rubber, leather, plastics, paper, cement, etc. Special tools made to your order. Also—steel letters, figures, stamps, dies and molds. Explain the job. We'll suggest the tool.

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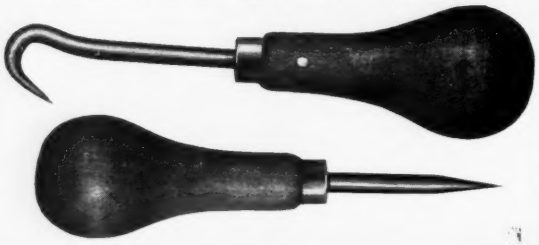
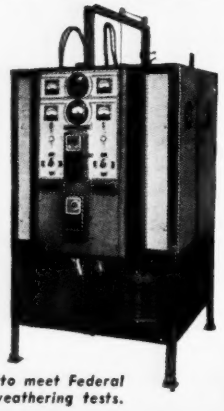


WEATHERING TEST for rubber products

Weathering effects of sunlight, rain, heavy dew and thermal shock reproduced in the laboratory at an accelerated rate that reduces years of actual weathering to a few days of testing in the —

ATLAS TWIN-ARC WEATHER-OMETER

The Twin-Arc Weather-Ometer has full automatic control of light and water periods. The Atlas Cycle Timer unit can be set to reproduce any combination of weathering conditions. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included on the control panel. After setting exposure cycle on the control panel the Weather-Ometer is safe to be left in continuous operation over night without attention except to replace carbons once in 24 hours.



The Atlas Weather-Ometer is required to meet Federal Specifications demanding accelerated weathering tests.

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Originators and sole manufacturers for over a quarter of a century. . . Weather-Ometers, Launder-Ometers, Fade-Ometers are the accepted standard accelerated testing machines all over the world.

and many more besides. Société Alsthom makes Plexiglas in various forms for a wide variety of purposes from all-French materials. It is largely used for making buttons and all sorts of small fancy articles and jewelry. Because of its light-conductivity, it is a favorite material for use in the manufacture of de luxe chandeliers, lamps and the like. A special quality of Plexiglas has been developed for use in the measurement of photoelasticity. All kinds of optical goods are made from this resin. In the Automobile industry in France Plexiglas is not extensively used.

"The Use of Chloro-Diphenyls in the Plastics Industry" was presented by M. Arnaud, of the Société R.V.A., Paris. The shortage of plasticizers has led many manufacturers to experiment with chloro-diphenyls, and the results have been so encouraging, they have added such excellent properties where introduced into plastic materials, that an ever-increasing outlet for them in the in the plastics industry is expected. During the war large amounts of chloro-diphenyls were used for the manufacture of substitutes of insulating oils for transformers and condensers.

Advantages of "Metalic" Tires

In a recent issue of *Revue Générale du Caoutchouc*,[1] the advantages of the use of steel to replace cotton or rayon cord in the manufacture of heavy-duty tires, as developed by Michelin in its "Metalic" tires, are set forth.

At this time when the problem of foreign exchange looms large in the calculations of manufacturers, one of the first advantages of steel over either cotton or rayon is that it is produced locally from domestic materials, whereas cotton and wood pulp (for the manufacture of rayon) must be imported.

A single one of the steel cords used in Michelin's "Metalic" heavy-duty tires has a diameter of not more than 9/10 mm. and can support a load of 100 kgs. without breaking; a cord of cotton having the same diameter breaks under a load of 9 kgs. As a result of the superior strength of steel, four steel plies can replace the 16 and even 20 cotton plies in extra-heavy-duty tires. At the same time, the four steel plies are two times more resistant at normal temperature than the 16 cotton plies, and four times more resistant at 120° C.

It is further claimed for the "Metalic" tires that they can be used until worn out; worn treads can be recapped once or even twice; whereas heavy-duty tires of the same dimensions, when made with cotton, cannot be retreaded. The use of metal permits the manufacture of tires of smaller diameters and hence also permits a lowering of the center of gravity of the tires; the reduced weight of the steel tires gives improved braking and acceleration; and finally twin fabric tires can be replaced by a single "Metalic" tire.

With the new possibilities, opened up by "Metalic" tires, designers will have to reconsider the problems not only of tire equipment, but also the problems connected with the chassis, the carriage, and even those of suspension and traction.

[1] June 6, 1947, p. 212.

Red Oil, Plasticizer for Rubber

When the distillation of coal tar is prolonged beyond the anthracene oils, a resinous distillate is obtained, called Red Oil. This product has been made by a petroleum refinery in the north of France which has undertaken the distillation since 1943 for use in the manufacture of lubricants. However Red Oil has also been found to have properties which suggest possibilities for its use as a plasticizer for rubber.

Mme. Jeanne Gleizes, of the Société des Huiles de Petrole, began a study[1] of Red Oil as a plasticizer for natural and synthetic rubber, comparing its influence on rubber as to plasticity, scorching, cure, aging, and mechanical properties, with that of pine tar and of Naftolen ZD. Formulae are given showing the use of Red Oil in tubing compounds, for abrasion resistance, and in compounds including reclaim or ebonite.

This Red Oil, patent application for which was made in France on January 5, 1946, has the following characteristics:

Density at 15° C.	1.272
Luchaire inflammability (flash point)	238° C.
Kinematic viscosity at 100° C.	60 to 120 centistokes
Ring and ball softening point	50° C.
Distillation at atmospheric pressure	
Start	300° C.
at 380° C.	7%
at 400° C.	11%
Free carbon	1%
Acid index	1
Substances absorbable by NaOH 40° Baumé, hot	1%
Substances absorbable by H_2SO_4	3%

[1] *Rev. gén. caoutchouc*, Apr., 1947.

Statistics on the French Rubber Industry

During the six-month period of October, 1946-March, 1947, France imported 29,658 tons of natural rubber in addition to 4,305 tons of GR-S. Imports of natural rubber fluctuated considerably from month to month, dropping from a peak of 11,324 tons in October 1946, to 768 tons in the following month, and again from 7,217 tons in February, 1947 to 2,233 tons in March, 1947. Consumption of natural rubber increased steadily from 3,791 tons in October, 1946, to 5,605 tons in March, 1947. No Buna was imported in the period, and consumption of this type of rubber was only 162 tons. Of the GR-S, about two-thirds entered the country during the first quarter of 1947, with shipments tending to increase from month to month. October, 1946, showed the highest monthly consumption of GR-S rubber for the period; namely 2,302 tons; from December, 1946, to March, 1947, inclusive, consumption of GR-S was fairly stable around 1,240 tons a month.

The rubber tires and tubes produced in the six months showed a total weight of 46,814 tons and included 33,812 tons of automobile tires, 5,325 tons of cycle tires, 3,510 tons of automobile inner tubes, and 599 tons of cycle tubes; in addition there were 4,846 tons of hose and tubing, 3,317 tons of belting, 3,683 tons of footwear, 9,640 tons of heels and soles, 1,005 tons of surgical and sanitary goods, 7,079 tons of mechanical rubber goods, and 1,028 tons of ebonite. Reclaimed rubber produced in this period came to 7,729 tons, and adhesives and solutions, to 1,642 tons. Month to month production figures show some variation, but no specially marked differences, which may be an indication that rate of production is not likely to undergo any great changes for the present.

Rubber at the Paris Fair

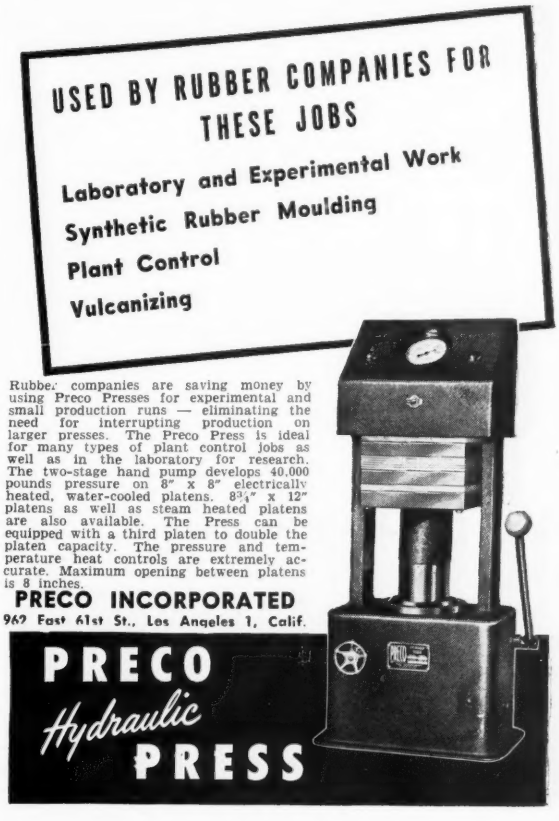
French rubber manufacturers have been concentrating their efforts on bringing production of the most necessary rubber goods to a level at least comparable with that of prewar days rather than on innovations. Consequently few of them were represented at the Paris Fair held this year. But among those who had stands were Kleber-Colombes (in which Goodrich is interested), Caoutchouc S. I. T., Turover, and Diffusion du Caoutchouc, all presented mainly mechanical goods. Kleber-Colombes took the opportunity to announce the forthcoming resumption of the manufacture of boots, which had been interrupted in the war years. The main attraction in the rubber section was the exhibit of the Institut Français du Caoutchouc, which for the first time since the war was able to set up a stand demonstrating the importance of the rubber industry and the manifold uses of rubber in all fields. The Institut also had on view several glass cases of samples indicating the possibilities of the French rubber industry in the most varied specialties.

GREAT BRITAIN

Second Foundation Lecture

The Second Foundation Lecture of the Institute of the Rubber Industry was delivered on June 6, 1947, by P. Schidrowitz, who took for his subject "The Impact of Snythesis on the Rubber Industry." The speaker was introduced to a large gathering by H. Rogers, chairman of the Council, who presided in the absence, through illness, of the president of the Institution, H. W. Franklin. Mr. Rogers pointed to Dr. Schidrowitz as the most widely known chemist in the industry in England or abroad and recalled that he was a Founder Member of the IRI and was mainly responsible for starting the Rubber School at Northern Polytechnic. He had received the Colwyn Gold Medal of the IRI in 1940, had done outstanding work in latex, had developed soft rubber with the late R. M. Ungar, and chlorinated expanded rubber with Redfarn. For more than 25 years he had been contributing Views and Reviews to *The India Rubber Journal*.

Dr. Schidrowitz began by explaining that by "synthesis" he meant the work of man and not of nature, and that for the purpose of his address the term "rubber industry" should not be restricted to that industry which produced only finished manufactured products, for that restriction would exclude all synthetic rubbers, plastics, fibers, and other materials. The remarkable progress of the last few years in the production of synthetic rubbers and plastics, he went on, was chiefly due to the development of polymerization, which permitted the designing and manu-


USED BY RUBBER COMPANIES FOR THESE JOBS
Laboratory and Experimental Work
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Rubber companies are saving money by using Preco Presses for experimental and small production runs — eliminating the need for interrupting production on larger presses. The Preco Press is ideal for many types of plant control jobs as well as in the laboratory for research. The two-stage hand pump develops 40,000 pounds pressure on 8" x 8" electrically heated, water-cooled platens. 8¾" x 12" platens as well as steam heated platens are also available. The Press can be equipped with a third platen to double the platen capacity. The pressure and temperature heat controls are extremely accurate. Maximum opening between platens is 8 inches.
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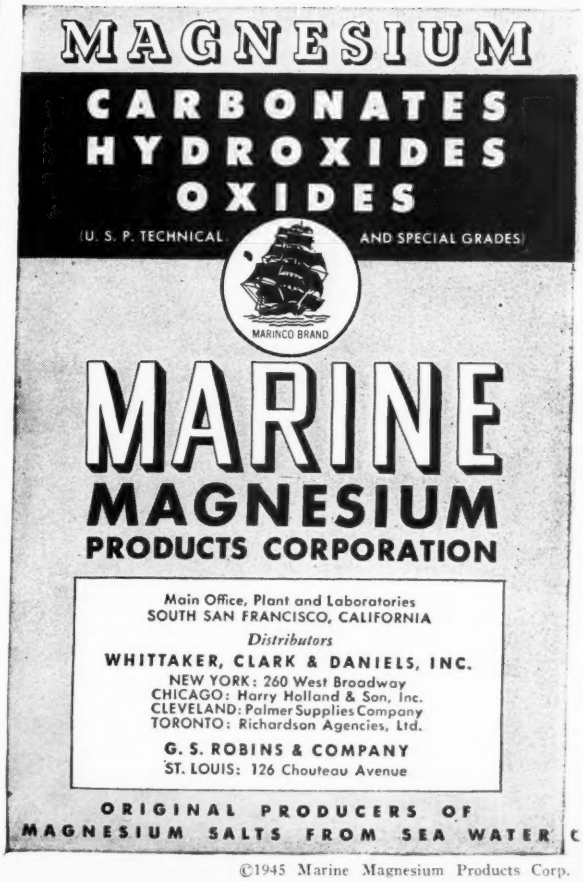

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Porcelain Glove Forms

— for dipped rubber gloves, including linemen's or electricians' gloves and surgeons' gloves. Some are made from our own stock molds and others from customers' molds.

Write today for our new catalog covering rubber glove and other forms for dipped rubber goods. Prompt attention given to requests for quotations based on your specifications or stock items.

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SYNTHETIC RESINS
USE WITH SYNTHETIC RUBBERS
FOR NONMARKING SOLES, HEELS AND TOPLIFTS
TO OBTAIN

★ EXCELLENT ABRASION RESISTANCE

★ SUPERIOR TEAR RESISTANCE

★ HARDNESS AND STIFFNESS

FOR DETAILS AND SAMPLES WRITE OR WIRE

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facture of "tailor-made" products and opened up possibilities undreamed of a few years ago, for instance, the large number of variations of the original all-purpose synthetic rubber, GR-S, many of which were already commercial. In this connection the speaker quoted Dr. Naunton's opinion that the development of these new types must ultimately lead to a synthetic rubber better than natural rubber. Dr. Schidrowitz agreed that the fundamental research being carried out all over the world might ultimately yield a material equal to natural rubber for industrial purposes, but he reserved judgment on the possibility of producing it at a cost that would make it economically competitive with natural rubber. He also felt that while it might not be impossible to produce a synthetic rubber so superior to the natural article that a large cost differential would not matter, the current foundations for such an advance had not yet been laid—that is, he felt that it would probably be necessary to start from different raw materials and—or to develop new methods. He agreed with those who hold that for the present, natural rubber is still the best for general use, and he also looked for new developments in natural rubber. In this connection he referred, among the rest, to the treatment of natural rubber with alcohol and glacial acetic acid to improve its properties.

The Lecturer then compared costs of producing natural and synthetic rubber and emphasized the importance, in the event of severe economic competition between these two rubbers, of native rubber in which labor costs, which on estates account for about 60% of the f.o.b. costs, play a subordinate part. Dr. Schidrowitz did not leave the subject of synthetic rubber before paying tribute to the United States for its synthetic rubber achievement which was, he said, under the circumstances probably the most remarkable in the chemical industry.

After discussing fibers, textiles, and modified rubbers, the speaker turned to plastics. The chief advantages of plastics over rubber were the possibility of continuous operating and the elimination of vulcanization. For certain uses, developed during the war, plastics would continue to be used despite higher costs; for instance, polyvinyl chloride for insulation, shoe soles (here polyvinyl chloride materials have shown better abrasion resistance than either rubber or leather), for leather cloth, and for flooring materials in the form of tiles to be used on a textile and cork base. As to floor coverings, Dr. Schidrowitz thought that certain plastics might prove to be the missing link in the production of "rubber linoleum" and hence worth the attention of rubber manufacturers.

The silicones received special mention. They were referred to as the most interesting in modern synthesis from the standpoint of heat resistance. With regard to the opinion sometimes heard that the plastics and the rubber industries would ultimately become integrated, if integration had not already taken place, the Lecturer held that while the rubber industry would benefit by the new processes and materials which synthesis had and would continue to place at its disposal, it would remain a specialized industry without broad integration with any other industry.

The lecture was followed by a dinner in honor of Dr. Schidrowitz whose great contributions to the rubber industry were praised in a speech by S. D. Sutton, who proposed Dr. Schidrowitz's health.

Congress of Pure and Applied Chemistry

The eleventh International Congress of Pure and Applied Chemistry, held in London, July 17-24, was held by 2,000 delegates from close to 30 different countries, including three from Russia. Among the large number of papers presented the following cover subjects of interest to the rubber and plastics industries:

"A Dynamic Model of Crystallization and Plastic Flow," by Sir Lawrence Bragg.

"Plastics Progress 1939-1947," by N. N. T. Samaras and F. R. J. Schatz.

"Structure of Elastomers," E. A. Hauser and Le Beau.

"Application of Infrared Methods to the Study of Polymers and Macromolecules." This subject was treated separately by G. Sutherland and by H. Thompson.

"Intrinsic Viscosity," and cognate matters were discussed in three separate papers by P. Debye; A. Goldberg and H. Mark; and W. Badgeley, Dr. Goldberg and Professor Mark, respectively.

"Control of Plasticity of Natural Rubber by Chemical Agents," by M. W. Philpott.

"Dissolving, Swelling, and Plasticizing of Polymers," R. Houwink.

"Crystallization of High Polymers and Its effect on Mechanical Properties," G. Gee.

"Review of Polycondensation Rubbers," by T. Naunton, R. Reynolds, D. Harper, and E. Walker.

"Reactions between Rubber and Unsaturated Compounds," by J. Le Bras and Dr. Delalande.
"Autoxidation of Rubber and Mechanism of Antioxidant Action," by W. C. Davey and Kendall.
"Redox Acceleration of Emulsion Polymerization," W. L. Semon.
"Mechanical Properties of Plastics," W. Lethersich.
"The Possibility of Hydroxyl Action in Phenolic Resin Formation," C. A. Redfarn.
"Modern Trends in the Application of Plastics," V. E. Yarsley.
"African Wild Rubbers," W. G. Wren.
"Microchemical Analysis of Rubbers," G. H. Wyatt.
"Dissolution of Vulcanized Rubbers and Its Bearings on Rubber Analysis," W. C. Wake.
"The Chemistry of Leather-Resinoid as a New Plastics Material," A. Colin-Russ.

Shortages of Carbon Black and Tires

Among the recurring topics of discussion have been the shortage of carbon black and tires. In July, Sir Jarold Kenward, president of the Tire Manufacturers' Conference, reviewed the existing tire situation. Decreased output of tires, he said, had been caused mainly by the fuel crisis, the shortage of tire fabric, and the lack of carbon black. The position with regard to fuel had improved for the time being; lack of labor in Lancashire, and not of cotton, was responsible for the shortage of tire fabric, but this difficulty was being overcome partly by the importation of finished cotton and cord and partly by the opening up of new factories in areas where labor was available; and adequate supplies of tire cord for full production were expected to be available before long. The main difficulty, however, was the shortage of carbon black. The British tire industry had sent a special mission to the United States, which had succeeded in securing a promise of increased supplies of carbon black.

The same topics have repeatedly been taken up in the House of Commons. About the end of June, a member pointed out that the Anglo-Iranian Oil Co.'s holdings produced 165,000,000 cubic feet of gas daily, enough to yield the 25,000 tons of carbon black needed by the United Kingdom tire industry. This company, he added, was understood to have a share capital of about £20,000,000, more than half of which was held by the British Government, which thus controlled the policy of the concern. The member maintained that the only alternative to carbon black from America, was black from natural gas in Persia; he asked a number of questions relative to production possibilities, among others, whether there was any secret agreement between the United States, which held a monopoly of carbon black, which made it impossible for the British Government or Anglo-Iranian Oil to set up plants for the production of the materials in Persia.

Suspicions about the American attitude with regard to carbon black were again voiced in the House of Commons a few weeks later when a member asked Sir Stafford Cripps, president of the Board of Trade, whether he was aware that there "are interests in America who have a corner in this (carbon black) at the moment and are very anxious to know if anything is being done to produce it in this country?" He added that if anything was being done, he hoped no information would be given on the

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subject. On a later occasion, the government stated that on June 27 stocks of carbon black for tire manufacture had amounted to 1,200 tons, enough for two weeks' requirements at the maximum postwar consumption.

American Rubber Controls and Prices of Rubber

The effect of rubber controls on prices and on Malayan economy also came in for much discussion in the House if Commons during the summer. On July 3, a member asked:

"Is it not a fact that this synthetic rubber is quite uneconomic? Is not one of its objects to try to keep down the price of natural rubber, often below the cost of production in the colonies?"

On July 7, members requested the Secretary of State for Foreign Affairs to make representations to the United States Govermnent to "remove the embargo on the import of rubber which was having an unfortunate effect on the economy of Malaya." On July 9 a statement was requested indicating the extent to which unemployment and hardship were being caused in Malaya by the "embargo" placed by America on natural rubber. In behalf of the government it was stated at this time that the standard of living of employes on Malayan estates had fallen below the prewar level, but that this condition was due primarily to the high cost of imported foods and other supplies and was not at the moment seriously accentuated by the drop in the price of rubber; nor had there been any large increase in unemployment.

It is to be noted that government explanations that there are American controls on the consumption of natural rubber, but no embargo, fail to shake the conviction that an embargo does in fact exist.

NETHERLANDS

First Auto Tire Factory in Holland

After a delay of seven years the first automobile tire factory in the Netherlands, the Netherlands Tire Industry Michelin, in 's-Hertogenbosch, was officially opened on June 24 by the Ministry for Economic Affairs. The ceremony was attended by the French Ambassador and representatives of the Michelin industries in France.

Plans for construction of the plant were completed in 1937, and the building complex was ready for operation early in 1940. The war, however, intervened, and upon Holland's liberation it was found that most of the machinery had been carried off to Germany, while the buildings themselves were severely damaged. With the help of Netherlands and French authorities, rehabilitation has now been brought to the point where manufacture of automobile tires can start immediately.

Although for the time being weekly production capacity is estimated at 5,000 tires, the output will be doubled in a few months, with an ultimate production of 14,000 tires per week as the goal. At the same time the plant will start manufacture of bicycle tires, with an output of 33,000 monthly.

Prewar importation of inner and outer automobile tires in the Netherlands totaled 250,000 to 275,000 annually. When the present factory and a second one, now being built at Enschede, for the N. V. Nederlandsch-Amerikaansche Autobanderfabriek Vredesteen, in which The B. F. Goodrich Co., Akron, O., U.S.A. is interested are in full production, domestic use will be covered for a large part by Netherlands production. This point is of particular importance for the foreign exchange situation, since the total value of prewar auto tire imports, calculated at present prices, would have amounted to 11 million guilders annually. Full production of the two plants will effect a saving of 50 to 60% of this amount in foreign exchange.

Other Dutch Business Notes

The Bataafsche Petroleum Maatschappij (Royal Dutch Shell) is to undertake important additions to its existing plants in the Netherlands, including a new factory at Pernis for the manufacture of resins. This plant, scheduled to operate at the end of 1948,

will have an annual capacity of about 2,000 tons and among the products will be polyvinyl resins, never before made in the Netherlands. For the present it is planned to confine activities in the plastics field to the production of these materials.

The Royal Weaving Co. of Hengelo is to establish a new chemical concern to produce materials for the Netherlands textile, plastics, paint, rubber, paper, and leather industries, thus insuring local supply of many chemicals which formerly had to be imported. The new company is said to have a capital of $3,800,000.

The Netherlands has made another series of trade agreements with European countries, including Switzerland and Poland. In both cases rubber figures among the products that the Netherlands will supply in exchange for goods including textiles, machinery and dyes (from Switzerland), and cotton materials, coal, and iron (from Poland). The Netherlands also undertakes to assist Poland in the restoration and construction of harbors and waterways.

GERMANY

A report on the German paint industry, discussing investigations of the British Intelligence Objectives Sub-Committee, includes data on formulae and processes used to overcome the shortage of basic materials. Emulsion paints, little used before the war, were extensively substituted for paints made with linseed oil or other drying oils. Some of the more important of these emulsion paints were made with polyvinyl acetate resins manufactured by the I. G. Farbenindustrie at Hoechst and sold under the name of Mowilith. In emulsified or dispersed form Mowilith resin is used as a paint medium, drying by evaporation only and yielding under appropriate circumstances tough, adherent films especially valuable for interior and exterior protective coatings. The manufacture of Mowilith dispersions increased considerably during the war until an output of 1,000 tons a month was finally reached. About 700 tons monthly were used in the manufacture of artificial leather and the remainder for paints, textiles, paper, and other purposes.

The report further describes the process for producing "Shambit," a corrosion-resistant coating composition developed by I. G. Farben at Ludwigshafen and Oppau, and also the Sambu process of heating used in the manufacture of synthetic resins, and the "Atephen" lacquer system employed for preparing chemically resistant-linings for metal tanks.

The first export trade fair for products of the United States and the United Kingdom zones of Germany was scheduled to run from August 18 to September 7. The fair was planned as part of the effort of Americans and British to revive the international trade of the combined zones. Rubber and plastic goods were among the items featured.

In both British and American zones rubber goods as well as asbestos goods are being produced for export.

The Gummiwerke Fulda A. G., Fulda, in the American zone of Germany, is reported to have increased output of tires, chiefly for trucks, to the extent that it is now at 80% of prewar level. Recently arrangements were completed also to produce inner tubes for cars, trucks, and bicycles.

CZECHOSLOVAKIA

The Czechoslovakian Government proposes to tax rubber tires at the rate of 40% and is also to impose a new high tax on all motor vehicles, it is reported.

The Nationalized "Kablo" concern is erecting a factory at Topocalny for the production of articles from plastics. To begin with the plant is expected to employ 250 persons, but the number is to be increased to 600 by the time the plant is completed.

During the first half of 1947 the Bata National Corp. reportedly was able to carry out its program satisfactorily and exceeded the targets set for rubber shoes by 17½% and for tires by 6%. Most of the rubber footwear now manufactured is shipped abroad in exchange for necessary raw materials including rubber and hides.

In line with the government's two-year plan to aid neglected and undeveloped districts, a large factory to manufacture rubber toys is to be erected in a town in Moravia. It is expected to cost about $2,000,000 and should be ready to start operating in 1950.

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Editor's Book Table

BOOK REVIEWS

"The Chemistry of Commercial Plastics." Reginald L. Wakeman. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 9¼ by 6 inches, 848 pages. Price, $10.

This book is one of the most comprehensive and informative volumes on plastics to be published in recent years. Despite its detailed coverage of the subject, the text is made readable and much more interesting by the inclusion of many historical reviews, side stories, and personal views. Each chapter starts with a historical review of the development of the material under discussion, gives an outline of the chemical structure, describes the manufacturing methods generally with the aid of illustrations, flowsheets, and diagrams, presents detailed and valuable data on the properties of the material, and concludes with a general discussion which features trade names, production figures, price data, and possible new applications.

The comprehensive nature of the book is best illustrated by the subject matter of the different chapters: history of the plastics industry; raw materials of the industry; general chemical principles of resinification; mechanical manipulation of plastics—molding; phenolic plastics; urea plastics, melamine plastics, aniline-formaldehyde resins; aryl sulfonamide-formaldehyde resins; alkyds and allied resinous esters; polyamides—nylon; coumarone-indene resins; miscellaneous hydrocarbon resins; vinyl resins; polyvinylidene chloride; polystyrene; polyvinyl carbazole; acrylic resins; contact resins; natural and synthetic elastomers; rubber derivatives; cellulose, lignin and protein plastics; polymeric organosilicon-oxygen compounds; and miscellaneous resins.

In keeping with the general high level attained in the text, the author in his chapters on rubber has presented an excellent comprehensive survey of the field of natural and synthetic rubbers and their derivatives. In addition to author and subject indices there is also appended a comprehensive index of trade names.

"Seen from E. A. Three International Episodes." Herbert Feis. Alfred A. Knopf, 501 Madison Ave., New York, N. Y. Cloth 7½ x 5 inches. 330 pages. Price $2.75.

Behind-the-scenes stories of America's prewar and wartime attempts to obtain national security in rubber and oil are related by the author, Adviser on International Economic Affairs in the State Department from 1931 to 1944. The book is based on lectures delivered by Mr. Feis at Indiana University in 1945 under the auspices of the Pattern Foundation.

Episode Number One, Rubber before Pearl Harbor, details the long struggle by America with the International Rubber Regulation Committee from 1937 on to have a voice in the rubber production quotas decided upon by the Committee, to raise these quotas in view of the desire of the United States to accumulate a strategic stockpile, and the various factors that delayed the achievement of a satisfactory stockpile until after the Pearl Harbor catastrophe. The Federal Loan Administrator of the period, Jesse L. Jones, is criticized for the stumbling blocks he placed in the way of obtaining a stockpile greater than the 650,000 long tons achieved by March, 1942. Failure to control the high domestic consumption of rubber during 1941 is considered to have contributed to limiting the size of the World War II stockpile also. However the existence of this stockpile made it possible to carry out the war production program, to tide us over the long period of construction of synthetic plants, and to provide the necessary minimum of crude rubber for mixture with synthetic, the author points out.

Episode Number Two, The Government Gives Attention to the Oil of the Middle East, recounts the long series of discussions with private oil interests in this country, the British Government, and the governments of the areas of the Middle East concerned, aimed toward insuring an adequate supply of oil for the mechanized army essential in modern warfare and for the steadily increasing demands for oil in times of peace. Based on his experiences in connection with these events, the author proposes what he calls "the elements of a satisfactory policy" with regard to oil.

Episode Number Three, Oil for Italy, describes the failure of the League of Nations to prevent Mussolini from obtaining the oil necessary for his conquest of Ethiopia. As such, it reviews the whole question of the use of economic sanctions to prevent or to terminate war. Further details along these lines are supplied in a Supplementary Note.

The book also contains some statistical data on rubber production and stocks as taken from the "History of Rubber Regulation 1934-1943."

"Physical Constants of Hydrocarbons. Volume IV. Polynuclear Aromatic Hydrocarbons." Gustav Egloff. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. Cloth, 9 by 6 inches. 548 pages. Price $17.50.

This fourth volume of "Physical Constants of Hydrocarbons" covers the polynuclear aromatic hydrocarbons. The compounds included under this classification are the fused ring hydrocarbons having at least one aromatic ring. The subject matter is a continuation of that given in Volume III and contains references through April, 1945. The compounds covered are those having the empirical formula C_nH_{2n-x}, where x represents even numbers from 8 through 88 and including 29.

As in previous volumes, available data on melting point, boiling point, density, and refractive index of each compound are given, together with the structural formula. The author points out that the physical data on the known polynuclear aromatics is so scanty that there is great need of further research, and the thousands of known compounds represent only a small fraction of the theoretical possibilities.

NEW PUBLICATIONS

"Fifty Years of the Dow Chemical Company, Its Progress and Its People." Dow Chemical Co., Midland, Mich. 24 pages. This illustrated booklet gives a highly readable history of Dow from its inception as the Midland Chemical Co. in 1890 to make bromides from brine, through its growth and expansion up to 1941, its wartime role, and its current status and prospects.

"Adamson-United Hydraulic Presses for the Rubber, Plastics and Plywood Industries." Catalog No. 462. Adamson United Co., 730 Carroll St., Akron, O. 8 pages. This catalog illustrates and briefly describes the company's hydraulic presses for the rubber, plastics, and plywood industries. The presses covered include tilting head, single-opening automatic, single-ram, double ram, belt curing, strip curing, plastics molding, and mat trimming types, among others.

"The Story Behind a Trade Mark." New Jersey Zinc Co., 160 Front St., New York 7, N. Y. 20 pages. By giving the story behind the company's horse head trade mark, this booklet at the same time reviews the growth of the company, its research activities, the applications of its products, the company's wartime work, its personnel, and its future prospects. Many illustrations show processing operations, product applications, personnel activities, and sales and service facilities.

"Remote Liquid Level Indicators." Bulletin WG-1822. Yarnall-Waring Co., Mermaid Lane, Philadelphia 18, Pa. 16 pages. The company's line of remote liquid level indicators is described and illustrated in this booklet. The design and operation of these indicators are described together with information on their applications.

"Flexamine, A Superflexing Antioxidant." Compounding Research Report No. 4. Naugatuck Chemical Division of United States Rubber Co., Rockefeller Center, New York 20, N. Y. 8 pages. Information on the chemical, physical, and compounding properties of Flexamine is presented together with data showing its use and effects in tire treads and soling and as a copper inhibiter.

"The United Nations, Its Charter and Organization." Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. 62 pages. This illustrated booklet was issued in commemoration of United Nations Day, observed in Bound Brook on June 26, 1947. The first part of the booklet is devoted to the meetings and conferences that led to the establishment of the UN charter, while the second part discusses the charter and explains the various branches of the organization.

"The Handling, Sampling and Testing of Fatty Acids." Armour & Co., 1355 W. 31st St., Chicago 9, Ill. 8 pages. This technical booklet gives information on the storing, pumping, processing, sampling, and testing of fatty acids. Descriptions of the equipment used are included together with information on the significance of the various tests, and a color conversion chart.

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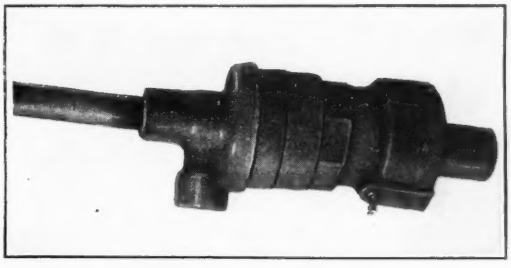

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Morgan and Norman Aves. Brooklyn 22, N. Y.

"Rubber Compounding Materials." Rubber Laboratory Release No. 6. Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 18 pages. This bulletin covers the use of Carbonex tar hydrocarbons in four typical GR-S recipes containing EPC black. Extensive laboratory test data appear on plasticity, tensile, hardness, tear resistance, abrasion resistance, crack-growth resistance, compression set, and resilience properties of the different recipes under varying curing cycles.

Geon 500 Series Polyblends." Service Bulletin 46-3A, April 15, 1947. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. 6 pages. The Geon 500 series polyblends are described herein, together with information on their typical physical properties and formulation and the use of various compounding ingredients. Included are three charts showing the variation in stress-strain properties caused by differences in pressing temperatures.

"Symposium on Plasticizers." Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 96 pages. Price, $1.75. This reprint from the *Journal of Polymer Science* includes the five papers presented at the symposium on plasticizers held at the University of Buffalo on June 7 and 8, 1946. These papers are: "Survey of Plasticizers for Vinyl Resins" by M. C. Reed; "Application of the Mechanistic Theory of Solvent Action to Plasticizers and Plasticization" by A. K. Doolittle; "Internal Plasticization, The Effect of Chemical Structure" by V. L. Simril; "Effect of Plasticizers on Second-Order Transition Points of High Polymers" by R. F. Boyer and R. S. Spencer; and "Creep Behavior of Plasticized Vinylite VYNW" by W. Aiken, T. Alfrey, Jr., A. Janssen, and H. Mark. In addition there are two papers on the "Use of Perbenzoic Acid in Analysis of Unsaturated Compounds," with part I, "Preparation and Stability of Solutions of Perbenzoic Acid," by I. M. Kolthoff, T. S. Lee, and M. A. Mairs, and part II, "Determination of External Double Bonds in Synthetic Rubber," by Kolthoff and Lee.

"Rubber: List of NBS Publications." By Lawrence A. Wood. National Bureau of Standards, United States Department of Commerce, Washington 25, D. C. Letter Circular LC869, dated July 1, 1947. 30 pages. This bulletin lists all publications on rubber issued by the Bureau of Standards. Information is also given on the purchase of government publications, government specifications and standards, and the availability of the listed publications, together with the designations and prices.

"Custom House Guide." Published by Custom House Guide, Box 7, Station P, Custom House, New York 4, N. Y. 1620 pages. Price, $20 plus postage. This eighty-fifth annual edition contains all information on customs regulations, port activities, duties, etc., needed by shippers. The price of the volume includes a monthly supplement giving the latest changes in regulations and other related information.

"The Neutronyx Series." Technical Data Sheet No. IND.-1. Onyx Oil & Chemical Co., Jersey City, N. J. 3 pages. This bulletin, the first of a series, describes the Neutronyx group of emulsifying and dispersing agents. Information given includes chemical and physical properties, specific performance data, technical advantages, and suggested uses.

"Simplex Anhydrex Underground Cable." Simplex Wire & Cable Co., Cambridge, Mass. 12 pages. This illustrated bulletin describes the company's line of underground electrical cables with neoprene sheathing, offered for use either with or without ducts. Information on the aging characteristics of the rubber insulating and sheathing compounds is given, and extensive tables present constructional, dimensional, and operating data on the different cables for use in power circuits and in series street-lighting circuits. A section is also included on detailed directions for making splices in the cables.

"Dielectric Relaxation and Viscosity of Long-Chain Dipolar Liquids." By Adolf Schallamach. The British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Hertfordshire, England. Publication No. 75. 14 pages. Experimental results are given to show that the temperature coefficient of dielectric relaxation time and viscosity of a number of long-chain liquids are not generally equal, in contradiction to the behavior of liquids of low molecular weight. Implications of the kinetic theory are briefly discussed.

"Textolite Laminated Plastics." General Electric Co., Pittsfield, Mass. 64 pages. This booklet offers complete information on the manufacture, application engineering, and properties of all types of Textolite laminates. Physical, electrical, and mechanical properties of the different grades of sheet material are given, together with information and illustrations of uses for various applications.

"Thiokol TP-90B in GR-M Stocks for Good Resilience and Low Temperature Flexibility." Technical Service Bulletin #102. Thiokol Corp., Trenton, N. J. 2 pages. The properties of TP-90B are given together with information on GR-M formulations and results obtained showing the material to improve resilience and low temperature flexibility.

"Where You Fit in at Dunlop." Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. 36 pages. This is a handbook distributed by the company to its new employes. It describes the company's history, rules and regulations, and organization and discusses such matters as health, sickness, and accident insurance, the functions of various employe organizations, and all other matters necessary to explain the role of the individual employe in the company.

"The Shafer Valve Control." Shafer Valve Co., Inc., Mansfield, O. 4 pages. This folder illustrates and describes a new high-pressure valve control which has wide application. Constructional details are given together with information on installation and operation.

Publications of Office of Rubber Reserve, Reconstruction Finance Corp., available from the Technical Service Section, Research and Development Division of ORR, 811 Vermont Ave., Washington 25, D. C. **"GR-S-60."** 10 pages. Dated June, 1947. **"GR-S-65."** 7 pages. Dated January, 1947. **"GR-S Latex, Type V."** 8 pages. Dated June, 1947. The Booklets on GR-S-60 and GR-S-65 briefly describe their composition, list their benefits and disadvantages as compared with standard GR-S give suggested uses, summarize their development, give processing and compounding characteristics, and give data on physical properties by means of charts and graphs. The booklet on Type V latex offers similar information and includes data on latex characteristics in addition to polymer properties. **"Special Purpose Rosin Soap GR-S Polymers Having Increased Tack."** 3 pages. This bulletin describes the family of rosin soap polymers and presents specific properties of these polymers together with suggested uses. The polymers included are GR-S-10, X-352-GR-S, GR-S-10AC, GR-S-16, GR-S-17, and X-274-GR-S.

"Cotton Year Book of the New York Cotton Exchange, 1945 and 1946." Prepared under the direction of Elmer S. Bonner. New York Cotton Exchange, 60 Beaver St., New York 4, N. Y. 172 pages. This, the eighteenth in the series of Cotton Year Books, presents extensive statistics on the production, movement, consumption, stocks, supply, and distribution of cotton for the years 1945 and 1946. Also included are cotton prices and loan data and information on manufacturing margins.

"American Speed-Jack Drives." American Pulley Co., Philadelphia, Pa. 6 pages. **"Corrosion Resistant Materials and Equipment."** U. S. Stoneware Co., Akron, O. 16 pages. **"Talk-A-Phone,** The World's Most Advanced and Complete Line of Inter-Communication." Talk-A-Phone Co., Chicago, Ill. 14 pages. **"Canadian Government Purchasing Standards Committee List of Specifications."** National Research Council, Ottawa, Ont., Canada. 10 pages. **"Approved Equipment for Industrial Fire Protection, 1947."** Associated Factory Mutual Fire Insurance Cos., 184 High St., Boston 10, Mass. 135 pages. Price $2. **"Ads on Wheels."** Meyercord Co., Chicago 44, Ill. 16 pages. **"Cochrane Direct Contact Open Heaters."** Cochrane Corp., Philadelphia 32, Pa. 24 pages. **"List of Inspected Electrical Equipment, May 1947."** 480 pages. **"Bi-Monthly Supplement to All Lists of Inspected Appliances, Equipment, Materials."** June, 1947. 56 pages. **"New Labels for Insulated Wires and Cables, Flexible Cords, and Fixture Wires."** Underwriter's Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. **"Ransburg Coating Processes."** Harper J. Ransburg Co., Indianapolis 7, Ind. 15 pages. **"Darex Meteorological Balloons."** Dewey & Almy Chemical Co., Cambridge, Mass. 28 pages. **"Gottscho Markomatic Industrial Marking Equipment."** Adolph Gottscho, Inc., New York, N. Y. 4 pages.

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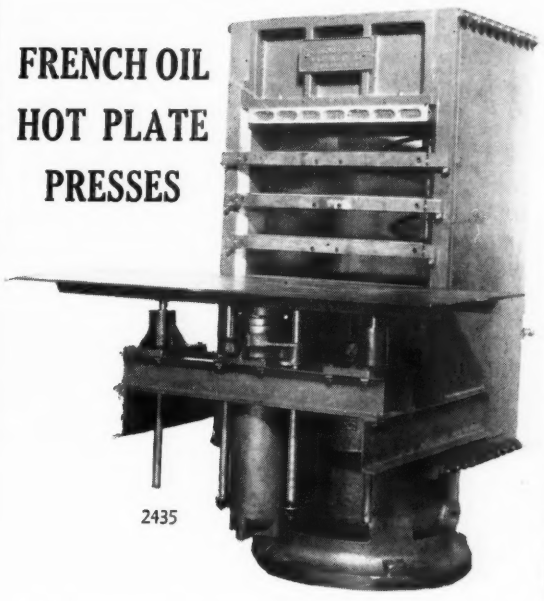

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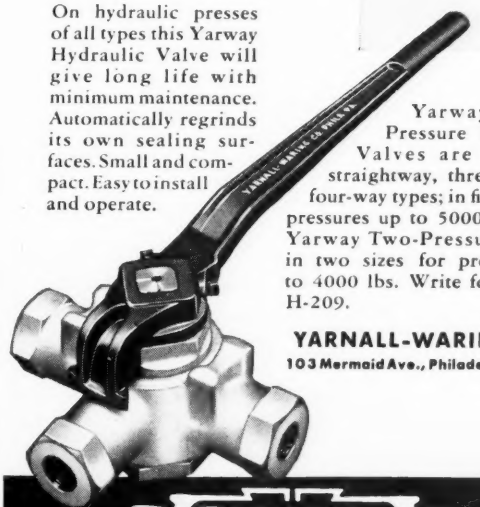

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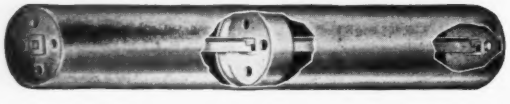

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Market Reviews

CRUDE RUBBER

Commodity Exchange

WEEK-END CLOSING PRICES

	June 28	July 26	Aug. 2	Aug. 9	Aug. 16	Aug. 23
1947						
Sept.	13.80	15.05	15.95	15.20	15.20	15.30
Oct.	13.85	15.00	15.85	15.15	15.10	15.20
Nov.	13.87	15.50	15.75	15.10	15.00	15.10
Dec.	13.90	15.50	15.70	15.10	14.95	15.00
1948						
Jan.	13.93	15.50	15.60	15.05	14.90	15.00
Feb.	13.97	15.50	15.60	15.05	14.85	15.00
Mar.	14.00	15.50	15.60	15.05	14.80	15.00
Apr.	14.03	15.50	15.60	15.05	14.80	14.90
May	14.05	15.40	15.60	15.05	14.75	14.90
June	14.10	15.40	15.60	15.05	14.75	14.90
July	14.15	15.40	15.60	15.05	14.75	14.90
Aug.	14.15	15.40	15.60	15.05	14.75	14.90
Sept.	14.15	15.40	15.60	15.05	14.75	14.90
Oct.			15.60	15.05	14.75	14.90

THE crude rubber futures market during August was comparatively dull and characterized by responsiveness to external and political factors. Prices on August 1 were at the monthly highs, but slumped over the week-end with the truce in Indonesia between the Dutch and the native government. Prices fell during the first week, with September dropping to 14.90¢ a pound, but then recovered somewhat and during the remainder of the month fluctuated irregularly with the average price for all deliveries in the 14.50 to 15.75¢ range.

The extreme sensitivity of the market was shown by the drop of 45 points in futures prices on August 12 upon receipt of reports of a stalemate in negotiations between rubber worker representatives and two of the Big Four rubber companies. On the other hand, prices rose 35 points on August 13 with the cancellation of the scheduled strike against The B. F. Goodrich Co. Towards the end of the month, the market was somewhat steadier, reflecting the gains in the London market and the firmer tone of the physical market.

As during July, the most activity shown was in December and March deliveries. The lightness of trading during August was reflected in the total volume of 6,330 tons sold or contracted for, as compared with 14,710 tons during July.

New York Outside Market

WEEK-END CLOSING PRICES

	June 28	July 26	Aug. 2	Aug. 9	Aug. 16	Aug. 23
No. 1 Ribbed Smoked Sheets						
Aug.	14.00	15.75	16.00	15.38	15.25	15.38
Sept.	14.00	15.75	16.00	15.38	15.25	15.38
Oct.		15.75	16.00	15.38	15.13	15.25
Nov.			16.00	15.38	15.13	15.25
No. 3 Ribbed Smoked Sheets			15.50	15.50	14.75	14.88	15.00
No. 2 Brown	11.75	13.88	13.63	13.25	12.88	12.88
Flat Bark	11.00	12.25	12.25	11.50	10.88	11.25

THE crude rubber spot market paralleled the activity of the futures market during August. The spot price on August 1 was 16.00¢ a pound, but fell with news of the Indonesian truce to a low of 14.88¢. Thereafter the market recovered, and prices fluctuated between 15 to 16¢ during the remainder of the month for No. 1 ribbed smoked sheets for August delivery.

Factory buying was light throughout the month, with some improvement noted during the second and third weeks. Price changes were generally quite small during each trading day in view of the listless market. Toward the end of the month the market showed increasing steadiness despite its quiet tone. There were reports that offers from the Far East were being made at higher prices, and that the sellers were resisting any downward market pressure. In view of the scattered and light demand, this effort toward raising prices had no apparent effect on the market, and prices remained relatively unchanged.

Fixed Government Prices*

	Price per Pound
Guayule	
Guayule *(carload lots)*	$01.71½
Latex	
Normal *(tank car lots)*	.30¾
Centrifuged *(tank car lots)*	.32½
Plantation Grades	
No. 1X Rubber Smoked Sheets	.23
1X Thick Pale Latex Crepe	.29
1 Thick Pale Latex Crepe	.29
2 Thick Pale Latex Crepe	.28½
3 Thick Pale Latex Crepe	.28¼
1X Thin Pale Latex Crepe	.29
1 Thin Pale Latex Crepe	.29
2 Thin Pale Latex Crepe	.28½
3 Thin Pale Latex Crepe	.28¼
Liberian A	.28⅝
AA	.29
RCMA Watermarked Crepe No. 16	.37⅞
17	.32⅛
18	.30⅞
Sole Crepe Trimmings	.28½
No. 1X Thin Pale Latex Crepe Trimmings	.28½
1X Brown Crepe	.21⅞
2X Brown Crepe	.21⅝
2 Remilled Blankets (Amber)	.21¾
3 Remilled Blankets (Amber)	.21⅝
Rolled Brown	.185
Synthetic Rubber	
GR-M (Neoprene GN)	.27½
GR-S (Buna S)	.18½
GR-I (Butyl)	.18½
Wild Rubber	
Upriver Coarse (crude)	.12⅝
(Washed and dried)	.20¾
Islands Fine (crude)	.14⅝
(Washed and dried)	.22½
Caucho Ball (crude)	.11⅝
(Washed and dried)	.19¾
Mangabiera (crude)	.08½
(Washed an ddried)	.18

* For a complete list of all grades of all rubbers see rubber Reserve Co. General Sales and Distribution Circular, July 1, 1945, as amended.

SCRAP RUBBER

IT IS reported that shipments of scrap tires have come to a halt in the East, and indications are that practically no tires are moving either in the East or at Akron. Trade factors state that they can hardly remember any period in their long scrap rubber experience when there was such an absence of trading as now exists. Prices are said to be of absolutely no consideration. Reclaimers are still not taking any tires and are also shying away from tubes. Eastern dealers are said to be still refusing to quote any prices on tubes.

A slightly better tone has been noted in peelings, where some grades are being utilized in export shipments. While prices for peelings have not changed, movement of Nos. 1, 2, and 3 grades are reported to have improved slightly.

Some hope exists that the scrap rubber business may pick up later on in September. Dealers venture the opinion that reclaimers' reserves of scrap must be pretty well used up by now, and the reclaimers will therefore be forced to reenter the market.

There were no price changes for scrap rubber during August. In view of the market lethargy, most quotations are purely nominal.

Following are dealers' buying prices for scrap rubber, in carload lots, delivered points indicated:

	Eastern Points (Net per Ton)	Akron, O. (Net per Ton)
Mixed auto tires	$10.00	$12.00
Truck and bus tires	nom.	nom.
Beadless tires	nom.	nom.
S.A.G. passenger (natural)	13.50	13.50
(Synthetic)	nom.	nom.
Truck (natural)	12.50	12.50
(Synthetic)	nom.	nom.
No. 1 peelings (natural)	42.50	42.50
(Synthetic)	nom.	nom.
(Recap.)	nom.	nom.
No. 2 peelings (natural)	27.50	27.50
(Synthetic)	nom.	nom.
(Recap.)	nom.	nom.
No. 3 peelings (natural)	25.00	25.00
(Synthetic)	nom.	nom.
	(¢ per Lb.)	
Mixed auto tubes	nom.	3.0
Red passenger tubes	nom.	nom.
Black passenger tubes	4.0	4.0
Truck tubes	3.75	3.75
Mixed puncture-proof tubes	nom.	nom.
Air brake hose	nom.	nom.
Rubber boots and shoes	nom.	nom.

RECLAIMED RUBBER

ALTHOUGH reclaimed rubber market conditions are still favorable and production continues at a high level, the decreased demand first apparent in June was felt during August. This reduced demand is directly attributable to the slowdown in the rubber industry and is expected to vanish with the forthcoming pick-up in rubber industry production.

Final May and preliminary June figures on the reclaimed rubber industry are now available. Production in May totaled 25,408 long tons; consumption was 21,908 long tons, 1,271 long tons were exported, and end-of-month stocks were 37,145 large tons, including an inventory adjustment of 1,389 additional long tons. Preliminary June statistics show a production of 24,094 long tons, consumption of 21,263 long tons, exports of 1,200 long tons, and end-of-month stocks of 39,605 long tons, including an upward inventory adjustment of 829 long tons.

No reclaimed rubber price changes were made last month.

Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire	1.18-1.20	8 / 8.5
Peel	1.18-1.20	9 / 9.5
Inner tube		
Black	1.20-1.22	12.75/13.25
Red	1.20-1.22	13.5 /14
GR-S	1.18-1.20	9.5 /10
Butyl	1.16-1.18	8.5 / 9
Shoe	1.50-1.52	8.25/ 8.75

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

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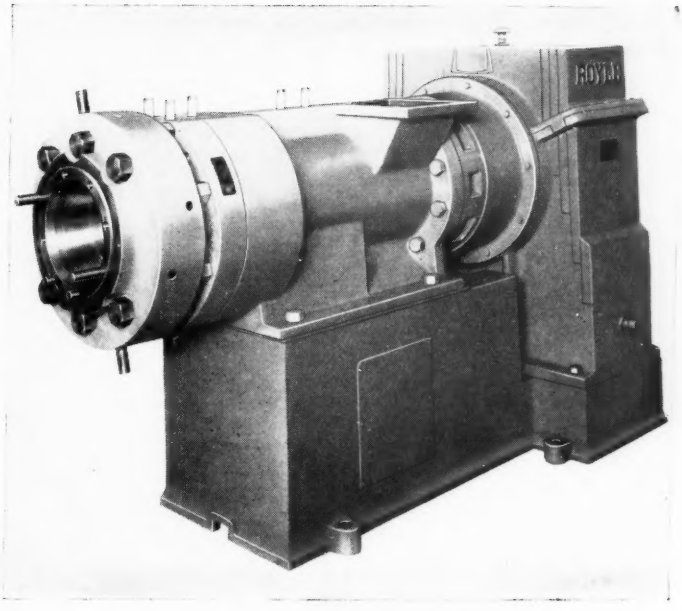
There has been a wealth of experience acquired in the 67 years John Royle & Sons have been building extruding machines. That "know how" is built into Royle Equipment—reflected in performance records.

Whether it is for research or heavy production there is a Royle to meet your specific requirements. Features have been incorporated to assure successful and economical results with the growing number of extrudable compounds.



JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

PATERSON 3, NEW JERSEY

London, England	Home Office	Akron, Ohio	Los Angeles, Cal.
James Day (Machinery) Ltd.	E. B. Trout J. W. VanRiper	J. C. Clinefelter	H. M. Royal, Inc.
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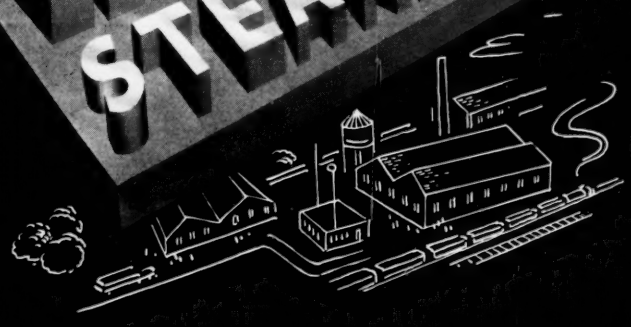
WARCO STEARATES

have found many new uses

New uses meant bigger and better facilities. They are now completed and are ready to serve you promptly.



WARWICK CHEMICAL COMPANY
DIVISION
580 FIFTH AVENUE, NEW YORK 19, NEW YORK

Sun CHEMICAL CORPORATION

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	June 28	July 26	Aug. 2	Aug. 9	Aug. 16	Aug. 23
Sept.	34.36	36.24	35.18	....	....	....
Nov.	32.22	34.26	33.26	33.05	32.91	31.87
1948						
Jan.	31.23	33.49	32.56	32.65	32.55	31.61
Mar.	31.23	33.62	32.68	32.67	32.52	31.58
May	30.75	33.17	32.21	32.26	32.17	31.25
July	29.78	32.35	31.42	31.48	31.37	30.45

THE August cotton market was rather dull during the first week as traders awaited government crop estimate reports, made on August 8. The reports indicated a higher estimated crop than had been expected and resulted in a market decline. About midway through the month a slight recovery set in, based on reports of a drought in the Texas cotton areas. During the third week the drought ended and induced a further wave of selling and liquidation in the market that brought prices even lower. The 15/16-inch middling spot price was 35.74¢ on August 1, rose to a peak of 36.19¢ on August 7, then fell irregularly to close the month at 33.51¢. November futures prices followed the spot price was 35.74¢ on August 1, rose to a rising to 33.98¢ on August 7, and closing at 31.50¢ on August 29.

The United States Department of Agriculture, in its report of August 8, estimated production for 1947 at 11,844,000 bales of cotton, with a condition of 78% of normal and an indicated yield of 270.8 pounds per acre. The actual crop for 1946 was 8,640,000 bales. The Census Bureau reported that 198,144 running bales had been ginned from the 1947 crop prior to August 1, as compared with 171,641 bales for the corresponding period in 1946.

Domestic consumption for the coming year is now placed at 8,500,000 or 9,000,000 bales, a drop of one to one and one-half million bales from last year. Exports are also believed about to decrease to two million bales, one million less than last year.

Fabrics

The fabrics market showed only limited activity during the first week of August as traders awaited the government estimate in hopes of a price decline in raw cotton. The report brought a slight flurry of trading which quickly subsided, and the market remained dull during the remainder of the month, although prices held firm. Mills were optimistic, believing the dullness to be the natural aftermath of the lively market activity during July.

The nearby buying policies of the rubber companies were provoking considerable hardship as regards prices and supplies of scarce gray goods. While most staple types of gray goods were in satisfactory condition, the printcloth situation was causing some concern. Because of its policy of buying only 30 to 60 days ahead, the rubber industry has had difficulty in getting printcloths because of the sold-up condition of this market. While production of rubber coated goods has not suffered as a direct result of the tight printcloth market, buyers were objecting to paying high prices for nearby goods and to the effort involved in scouring the market for such cloth. It was stated that some mills were asking top prices for delivery to the end of the year. On the other hand, supplies of sheetings and most specialty gray goods for the rubber trade were described as adequate, with mills cooperative on handling special requests. There were some indications that a tight supply was developing in the lighter weight sheetings.

RAYON

DOMESTIC rayon shipments during July totaled 81,800,000 pounds, 15% above the June level and 21% above that of July, 1946. Domestic deliveries of rayon during the first seven months of 1947 amounted to 534,300,000 pounds, 10% above the same period last year. Rayon filament yarn shipments in July were 63,000,000 pounds, 15% above June totals, and consisted of 44,200,000 pounds of viscose and cupra, and 18,800,000 pounds of acetate. Cumulative domestic shipments of rayon yarn for the first seven months of this year were 9% above those of 1946.

Shipments of rayon yarn to tire manufacturers for the first quarter of 1947 totaled 55,800,000 pounds, and 56,100,000 pounds for the second quarter. The total tire fabric and cord manufactured the first three months of 1947 was 151,000,000 pounds, of which 58,000,000 pounds were rayon and nylon fabric and cord, 71,000,000 pounds were cotton tire fabric, and 22,000,000 pounds were cotton tire cord. These first-quarter totals are the highest on record, being 5.5% above the 1946 fourth quarter output and 22.5% above that of the first quarter of 1946. In addition, this production was over 2¼ times the prewar quarterly average output of tire fabric and cord.

Foreign Trade Opportunities

(Continued from page 822)

Etablissements Mattsom, S. P. R. L., 3 Avenue de l'Art Flamand, Antwerp, Belgium: rubber goods such as hot water bottles, gloves, and nipples.

Etablissements John Van Eyck, 83 Rue du Péage, Antwerp, Belgium: linoleum, rubber, and plastic floor coverings.

R. H. Whittorn and J. A. Smithson, representing The Olympic Tyre & Rubber Co., Ltd., 68 Cross St., West Footscray, Melbourne, Victoria, Australia: materials for manufacturing insulated cable.

Pierre Robert Lehmann, 2 bis rue de Strasbourg, Tunis, Tunisia: tires.

S. De Groof-De Deckers, Aartselaar, Antwerp, Belgium: Lastex yarns.

Imprimerie Hénon, 11 Rue Stendhal, Paris, France: rubber glue, printing press blankets.

Antoine Leyssens-Vancan, 5 Rue Docteur Willems, Hasselt, Belgium: plastic fabrics, rubber or plastic baby pants, baby baths (plastic), sponges, and other nursery items other than toys, and adhesive tape.

Carlos J. Salas Perales, representing Carlos G. Salas y Salinas e Hijo, Junin 311, Lima, Peru: tires.

Yakup Soyugenc, representing Cifkurt Ticaret ve Sanayi T. A. S., Kafeli Huseyin Han Altinda, Rihtim Caddesi, Galata, Istanbul, Turkey: tires.

Wayne W. Jolley, representing American Service Co., Ltd., 31 Ban Moh, Bangkok, Siam: tires, radios, refrigerators.

Ets. A. Rosenbaum, 14-16 Rue Foppens, Brussels, Belgium: office supplies including fountain pens, pencils, erasers.

S. G. Soman, Ltd., 11-13 Baker St., London, W. 1, England: rubber textiles, shoe findings.

Joao Borba, Jr., Rua Veneza 228, Sao Paulo, Brazil: rubber supplies for hospitals, etc.

Assad Karam, representing Helim Hanna & Co., Rue Fakhry Bey, Beirut, Lebanon: rubber goods, toys.

Amin Abu Fadil, 13 Shabatai Levy, Haifa, Palestine: textiles, tires, automobile spare parts.

H. Orelowitz and S. Lessem, representing Zenith Shipping & Agency Co. (Pty.) Ltd., Empire Bldg., Corner Market and Kruis St., Johannesburg, Union of South Africa: textiles, automobile accessories.

Waddington's Garage, 162 Harbour St., Kingston, Jamaica, B.W.I., automobile parts and accessories.

Petrolia Motor Sales, Petrolia, Ont., Canada: automobile and truck casings and inner tubes.

Centrabel, 20 Rue Brogniez, Brussels, Belgium: electric wire and cable.

Citalo, S. A., 49-51 Place Try-Calau, Lodelinsart, Belgium: rubber balls and toys.

Etablissements Schaerer & Vida, S. A. 442 Avenue de la Couronne, Brussels, Belgium: industrial chemicals, including those used in the rubber, varnish, and textile industries.

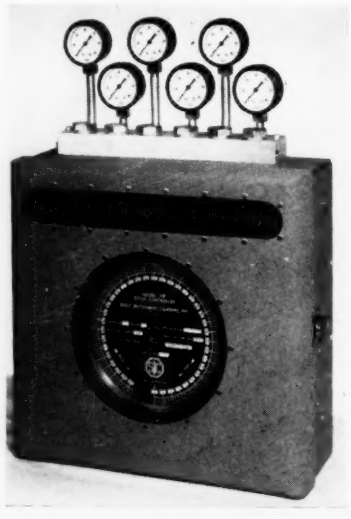
Rubber & Vloerenbedrijf "Damen," 167 Wagenstraat, The Hague, Netherlands: plastic flooring.

Miss Ethylene MacDonald, 2407 Floor St. W., Toronto 9, Ont., Canada: essential ingredients for the manufacture of printing ink, paints, varnishes, lacquer, and rubber.

Aziz Isvan, representing Aziz Isvan ve Ortagi, Ltd., Sirketi, Kat 3, Ankara Han, Galata, Istanbul, Turkey: tires.

Import Opportunities

The Hallingbury Trading Co., Ltd., "Silverpines," Little Hallingbury, near Bishop's Stortford, Hertfordshire, England: cotton woven elastic braid for suspenders.



Seely PB2 Time Cycle Controller

Multiple Controller

THE Seely PB2 time cycle controller, which starts, times, correlates, and stops multiple operations in any process or machine cycle actuated by air pressure or electricity, was originally developed to control plastic and rubber molding equipment; it also offers equal savings in operator effort and uniformity of product to batch processors in the chemical and food industries. Its widest acceptance is found in operations where frequent changes are desired.

The controller provides unlimited flexibility of scheduling which can be varied at will, without use of tools and without changing any parts. Air control is integral and does not require intermediary use of solenoid valves. Pilot valve action is equally rapid in the longest schedules, as well as the shortest.

The time selector wheel carries 150 days. These are selected to provide timing, to within 0.67% of the overall time range of the instrument, for each successive event scheduled in the operation selector. Standard cycles are available to 750 minutes. The operation selector camshaft with 10 working positions operates pilot valves or precision switches in any desired sequence, according to the operation selector keys which are preset. The operations are triggered by impulses from the time selector wheel. Both time and sequence sections are driven by gear-head motors of ample power. Resetting is automatic at completion of the program and requires one second for each unused operation. Seely Instrument Co., Inc.

VULCANIZED VEGETABLE OILS

—RUBBER SUBSTITUTES—

•

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

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A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

Regular and Special Constructions of

COTTON FABRICS

Single Filling **Double Filling**

and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

320 BROADWAY
NEW YORK

COMPOUNDING INGREDIENTS

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.03½ / $0.06
Rottenstone, domestic	ton	36.00 / 43.00

Accelerators, Organic

A-10	lb.	.40 / .47
A-19	lb.	.52 / .58
A-32	lb.	.59 / .69
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 8	lb.	.75
49	lb.	.40 / .42
552	lb.	1.63
808	lb.	.59 / .61
833	lb.	1.13 / 1.15
Acrim	lb.	.65
Advan	lb.	.55
Aero AC 50	lb.	.46 / .52
Altax	lb.	.35 / .445
Antox	lb.	.54 / .56
Arazate	lb.	1.53
Beutene	lb.	.59 / .64
B-I-F	lb.	.34 / .39
Butasan	lb.	1.10
Butazate	lb.	1.10
Butyl Eight	lb.	1.00 / 1.05
Zimate	lb.	1.10
Captax	lb.	.27 / .345
C-P-B	lb.	1.95
Cumate	lb.	1.60
Cuprax	lb.	.60 / .62
Diesterex N	lb.	.50 / .57
DOTG (diorthotolylguanidine)	lb.	.44 / .50
DPG (diphenylguanidine)	lb.	.39 / .45
El-Sixty	lb.	.39 / .46
Ethasan	lb.	1.10
Ethazate	lb.	1.10
Ethyl Selenac	lb.	1.60
Thiurad	lb.	1.25
Tuads	lb.	1.25
Tuex	lb.	1.25
Zimate	lb.	1.10
Ethylidene Aniline	lb.	.42 / .43
Formaniline	lb.	.36 / .37
Good-Rite Erie	lb.	.60 / .62
Hepteen	lb.	.42 / .48
Base	lb.	1.80 / 1.90
M-B-T	lb.	.27 / .33
M-B-T-S	lb.	.35 / .41
Methasan	lb.	1.20
Methazate	lb.	1.20
Methyl Selenac	lb.	1.60
Tuads	lb.	1.25
Zimate	lb.	1.20
Monex	lb.	1.25
Mono-Thiurad	lb.	1.25
Morfex 33	lb.	.60 / .65
O-X-A-F	lb.	.38 / .43
Pentex	lb.	.74 / .84
Flour	lb.	.1225/ .1325
Permalux	lb.	1.18 / 1.20
Phenex	lb.	.49 / .54
Pinazate	lb.	1.53
Polyac	lb.	1.40
Rotax	lb.	.39 / .42
S. A. 52, 62	lb.	1.25
57	lb.	1.20
66	lb.	1.60
67, 77	lb.	1.10
Satex	lb.	1.15
Santocure	lb.	.53 / .60
Selazate	lb.	1.60
SPDX-G	lb.	.53 / .58
Tellurac	lb.	1.60
Tetrone	lb.	1.25
A	lb.	1.85
Thiocarbanilide	lb.	.34 / .39
Thiofide	lb.	.35 / .42
Thionex	lb.	1.25
Thiotax	lb.	.27 / .34
Thiurad	lb.	1.25
Thiuram E	lb.	1.25
M	lb.	1.25
Trimene	lb.	.54 / .64
Base	lb.	1.03 / 1.18
Triphenylguanidine (TPG)	lb.	.45 / .50
Tuex	lb.	1.25
2-MT	lb.	.58 / .60
Ulto	lb.	.99 / 1.04
L	lb.	1.04
Ureka	lb.	.55 / .62
Blend B	lb.	.55 / .62
C	lb.	.52 / .59
Vulcanex	lb.	.45
Z-B-X	lb.	2.45
Zenite	lb.	.37 / .39
A	lb.	.42 / .44
B	lb.	.39 / .41

Accelerator-Activators, Inorganic

Lime, hydrated	ton	8.00 / 12.14
Litharge, commercial	lb.	.166 / .175
Eagle, sublimed	lb.	.17 / .175
FBS	lb.	.17 / .175
Red lead, commercial	lb.	.176 / .19
Eagle	lb.	.18 / .185
#2 RM	lb.	.18 / .185
White lead, basic	lb.	.1575/ .175
Eagle	lb.	.1575/ .16
National	lb.	.16 / .1725
Silicate	lb.	$0.16 / $0.175
Eagle	lb.	.1635/ .1685
Zinc oxide, commercial†	lb.	.095 / .135

Accelerator Activators, Organic

Activex	lb.	.20 / .22
Barak	lb.	.60
Bunac K-17	lb.	.17 / .19
D-B-A	lb.	1.95
Delac P	lb.	.45 / .52
Double distilled cottonseed fatty acids	lb.	.1175/ .14
Emery's 0-18 Elaine	lb.	.255 / .375
S-24	lb.	.34 / .43
Guantal	lb.	.43 / .50
Laurex	lb.	.33 / .36
Lead oleate	lb.	.2025
MODX	lb.	.205 / .345
Neo-Fat H.F.O.	lb.	.21 / .22
1-60	lb.	.20 / .21
1-65	lb.	.24 / .25
Palmalene	lb.	.15
Plastone	lb.	.27 / .30
Ridacto	lb.	.22 / .24
Stearex Beads	lb.	.1475/ .1575
Stearic acid, single pressed	lb.	.225 / .235
Double pressed	lb.	.23 / .24
Triple pressed	lb.	.2525/ .2625
Stearite	lb.	.1475
Tonox	lb.	.50 / .59
Zinc stearate	lb.	.43 / .44

Alkalies

Caustic soda, flake	100 lbs.	3.00 / 5.45
Liquid, approx. 50%	100 lbs.	2.00 / 2.10
Solid	100 lbs.	2.60 / 5.05

Antioxidants

Age-Rite Alba	lb.	2.15 / 2.25
Gel	lb.	.55 / .57
H.P.	lb.	.58 / .60
Hipar	lb.	.70 / .72
Powder	lb.	.43 / .45
Resin	lb.	.52 / .54
D	lb.	.43 / .45
Stalite	lb.	.43 / .45
White	lb.	1.30 / 1.40
Akroflex C	lb.	.58 / .60
Albasan	lb.	.69 / .74
Aminox	lb.	.43 / .52
Antisol	lb.	.23 / .24
Antox	lb.	.54 / .56
Aranox	lb.	2.15
Betanox Special	lb.	.61 / .70
B-L-E	lb.	.43 / .52
Powder	lb.	.61 / .70
B-X-A	lb.	.43 / .52
Copper Inhibitor X-872-A	lb.	1.50
Electol H	lb.	.43 / .50
Flexamine	lb.	.58 / .67
Heliozone	lb.	.23 / .24
Mekon micro-crystalline wax, amber	lb.	.14 / .16
Black	lb.	.135 / .155
Yellow	lb.	.155 / .175
Neozone (standard)	lb.	.66 / .68
A	lb.	.43 / .45
C	lb.	.47 / .49
D	lb.	.43 / .45
Distilled	lb.	.48 / .50
Parazone	lb.	.68
Perflectol	lb.	.58 / .65
Permalux	lb.	1.53 / 1.55
Rio Resin	lb.	.43 / .45
Santoflex B	lb.	.43 / .50
BX	lb.	.57 / .64
Santovar-A	lb.	1.30 / 1.37
Santowhite	lb.	1.40 / 1.52
S.C.R.	lb.	.32 / .34
Solux	lb.	1.48 / 1.50
Stabilite	lb.	.48 / .50
Alba	lb.	.69 / .74
L	lb.	.48 / .50
Sunproof	lb.	.23 / .28
Jr.	lb.	.17 / .22
Thermoflex	lb.	1.48 / 1.50
A	lb.	.70 / .72
C	lb.	.54 / .56
Tonox	lb.	.50 / .59
Tysonite	lb.	.215 / .2225
V-G-B	lb.	.43 / .52
Zenite	lb.	.37 / .39

Antiseptics

Copper naphthenate, 6-8%	lb.	.21
G-4	lb.	.95 / 1.40
G-11	lb.	4.50 / 4.75
Pentachlorophenol	lb.	.20 / .25
Resorcinol, technical	lb.	.68
Zinc naphthenate, 8-10%	lb.	.1975/ .24

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed and those readers interested should contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxide.

Blowing Agents

Ammonium bicarbonate	lb.	$0.064 / $0.0975
Carbonate	lb.	.0825/ 0.095
Sodium bicarbonate	100 lbs.	1.85 / 2.35
Carbonate, technical	100 lbs.	1.08 / 4.13
Sponge Paste	lb.	.20
Unicel	lb.	.60
ND	lb.	1.00

Bonding Agents

MDI	lb.	7.25 / 7.75
50	lb.	3.60 / 3.85
Ty-Ply Q. S.	gal.	6.75 / 8.00

Brake Lining Saturants

B.R.T. No. 3	lb.	.0175/ .0185
Resinex L-5	lb.	.0175/ .025

Carbon Blacks

Conductive Channel—CC

Continental R-20	lb.	.055 / .102
R-40	lb.	.055 / .102
Spheron C	lb.	.08 / .125
I	lb.	.066 / .111
N	lb.	.185 / .25
Voltex	lb.	.15 / .185

Easy Processing Channel—EPC

Continental AA	lb.	.055 / .102
Kosmobile 77/Dixiedensed 77	lb.	.055 / .102
Micronex W-6	lb.	.055 / .097
Spheron #9	lb.	.06 / .102
Witco #12	lb.	.055 / .102
Wyex	lb.	.055 / .117

Hard Processing Channel—HPC

Continental F	lb.	.055 / .102
HX	lb.	.055 / .117
Kosmobile S/Dixiedensed S	lb.	.055 / .102
Micronex Mark II	lb.	.055 / .097
Spheron #4	lb.	.06 / .102
Witco #6	lb.	.055 / .102

Medium Processing Channel—MPC

Arrow TX	lb.	.055 / .117
Continental A	lb.	.055 / .102
Kosmobile S-66/Dixiedensed S-66	lb.	.055 / .102
Micronex Standard	lb.	.055 / .097
Spheron #6	lb.	.06 / .102
Witco #1	lb.	.055 / .102

Conductive Furnace—CF

Statex A	lb.	.08 / .10
Sterling I	lb.	.62

Fine Furnace—FF

Statex B	lb.	.0525/ .09
Sterling 99	lb.	.10

High Elongation Furnace—HEF

Sterling K	lb.	.05 / .09

High Modulus Furnace—HMF

Continex HMF	lb.	.16
Kosmos 40/Dixie 40	lb.	.05 / .075
Modulex	lb.	.05 / .075
Philblack A	lb.	.05 / .06
Statex 93	lb.	.05 / .075
Sterling L	lb.	.05 / .09

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.035 / .055
Essex	lb.	.035 / .055
Furnex	lb.	.035 / .06
Gastex	lb.	.035 / .075
Kosmos 20/Dixie 20	lb.	.035 / .055
Pelletex	lb.	.035 / .075
Sterling R, S	lb.	.035 / .075

Fine Thermal—FT

P-33	lb.	.05

Medium Thermal—MT

Thermax	lb.	.03

Chemical Stabilizers

Dutch Boy DS-207	lb.	.525
Plumb-O-Sil	lb.	.26
Tribase	lb.	.2225
Lead stearate	lb.	.44 / .46
Vanstay	lb.	.38 / .40
White lead, basic	lb.	.1575/ .175

Colors

Black

Lampblack, commercial	lb.	.09 / .26

Blue

Du Pont	lb.	.945 / 3.95
Stan-Tone	lb.	1.40 / 4.40
Toners	lb.	.30 / 3.50

Brown

Mapico	lb.	.1135

Green

Chrome	lb.	.10 / .4275
Oxide	lb.	.30 / .33
Du Pont	lb.	1.10 / 3.20
Guignet's	lb.	.70
Stan-Tone	lb.	1.60 / 3.60
Toners	lb.	.35 / 4.00

Orange

Du Pont	lb.	2.50 / 3.35
Stan-Tone	lb.	2.20
Toners	lb.	.30 / 1.50

Red

Antimony crimson, 15-17%	lb.	.48
Antimony, R.M.P. No. 3	lb.	.48
Sulfur free	lb.	.52
Cadmium red lithopone	lb.	1.10 / 1.50

LABORATORY Mills & Presses

The EEMCO Laboratory Mill is entirely enclosed, ready to operate. It is equipped with built-in motor, control and variable speed drive. Mechanism readily accessible.

The 12" x 12" EEMCO 42-ton Laboratory Press is furnished with self-contained hand pumping unit, air operated fast closing, steam or electric platens, adjustable opening from 6" to 18".

Both Mill and Press are designed for research, development and small scale production.

Bulletins and additional detailed description on any EEMCO products will be sent on application . . . Early deliveries now.

Sales Representatives

OHIO
DUGAN & CAMPBELL
907 Akron Savings & Loan Bldg.
AKRON, OHIO.

EASTERN
H. E. STONE SUPPLY CO.
OAKLYN, N. J.

MIDWEST
HERRON & MEYER OF CHICAGO
38 South Dearborn Street
CHICAGO 3, ILL.

Mills • Presses • Extruders
Tubers • Strainers • Washers
Crackers • Calenders • Refiners

EEMCO ERIE ENGINE & MFG. CO.
953 EAST 12th ST., ERIE, PENNA.

GOOD ODOR TIPS THE SCALES TOWARD BETTER RUBBER SALES

When the choice between your rubber product and another hangs in the balance, *better* rubber odor weights the decision. Assure sales-compelling odor appeal for rubber goods and rubberized fabrics the easy, swift and economical way with Givaudan's PARADORS*.

PARADORS are available in a wide variety of odor types, and special odorants can be developed for the most exacting individual requirements, either to mask processing odors or to impart specific and enduring effects in the final product.

Make use of Givaudan's extensive experience and highly specialized development facilities to help solve your odor control problems. Write for further information today.

*PARADOR Reg. U. S. Pat. Off.

"BUY WISELY—BUY GIVAUDAN"

Givaudan-Delawanna INC.

Industrial Products Division

330 West 42nd Street, New York 18, N. Y.

Du Pont	lb.	$1.65 / $1.80
Iron oxide	lb.	.0675/ .1025
Mapico	lb.	.0885/ .096
Rub-Er-Red	lb.	.0975
Stan-Tone	lb.	1.10 / 2.20
Toners	lb.	.25 / 4.15
White		
Lithopone, titanated		
Cryptone BT	lb	.0725/ .0825
Titanium pigments		
Rayox LW	lb.	.165 / .175
R-110	lb.	.185 / .195
Titanox-A series	lb.	.145 / .1525
Titanox-AA	lb.	.145 / .1525
B-30	lb.	.0575/ .06
C	lb.	.055 / .0575
RA, RA-10	lb.	.155 / .1625
RCHT	lb.	.055 / .0575
Zopaque	lb.	.145
Zinc oxide, commercial	lb.	.095 / .135
Azo ZZZ-11-44,-55	lb.	.10 / .1025
-66	lb.	.1225/ .125
35% leaded	lb.	.1175/ .12
Eagle AAA, lead free	lb.	.10 / .1025
35% leaded	lb.	.1175/ .12
50% leaded	lb.	.1258/ .1278
Florence Green Seal 8	lb.	.1175/ .12
Red Seal-9	lb.	.1125/ .115
White Seal-7	lb.	.1225/ .125
Horsehead XX-4, -78, -166	lb.	.095 / .0975
Kadox-15, -17, -72	lb.	.095 / .0975
-25	lb.	.1175/ .12
St. Joe, lead free	lb.	.09 / .0925
Zinc sulfide, commercial	lb.	.10 / .1075
Cryptone ZS 800	lb.	.10 / .1025
Yellow		
Cadmolith	lb.	.75 / .85
Chrome	lb.	.26 / .276
Du Pont	lb.	1.48 / 1.95
Mapico	lb.	.0685/ .071
Stan-Tone	lb.	1.20 / 1.75
Toners	lb.	.50 / 1.37
Dispersing Agents		
Darvan Nos. 1, 2	lb.	.19 / .30
Stan-Chem	lb.	.1225/ .2587
Triton R-100	lb.	.12 / .25
Dusting Agents		
Glycerized Liquid Lubricant, concentrated	gal.	1.50
Lubrex	lb.	.25 / .30
Mica	ton	.0625/ .0675
Pyrax A	ton	11.50
W. A.	ton	13.00
Zinc Stearate	lb.	.43 / .44
Extenders		
Advagum 1098	lb.	.42
1198		.40
B.R.S. 700	lb.	.012 / .018
B. R. T. No. 7	lb.	.0215/ .0225
Dielex B	lb.	.06
Extender 15		.32
600	lb.	.208
Factice		
Amberex Type B	lb.	.20
Brown	lb.	.095 / .19
Neophax A	lb.	.165
White	lb.	.10 / .20
Insulac W	lb.	.055 / .06
Mineral Rubbers		
Black Diamond	ton	25.00 / 30.00
Extender 600	lb.	.1643
Hard hydrocarbon	ton	32.00 / 34.00
No. 38	ton	25.00
Parmr	ton	21.00 / 29.00
Multi-Plast	lb.	.0425/ .0475
Naftolen HV	lb.	.11 / .12
LV, MV	lb.	.0525/ .0575
R-100	lb.	.11 / .12
Nuba Nos. 1, 2	lb.	.029
No. 3X	lb.	.0425
Rubber Substitutes,		
Black	lb.	.09 / .15
Brown	lb.	.105 / .1875
White	lb.	.0975/ .165
Synthetic 100	lb.	.41
Vinosol Resin	lb.	.025 / .035
Vistanex	lb.	.32 / .36
Fillers, Inert		
Asbestos fiber	ton	20.50 / 65.00
Barytes, floated white	ton	30.50 / 45.00
Off-color, domestic	ton	19.00 / 20.00
Blanc fixe, dry, precip	ton	67.50 /100.00
Clays		
Champion	ton	13.00
Crown	ton	11.00 / 23.00
McNamee	ton	12.50
Stellar-R		50.00
Flocks		
Cotton, dark	lb.	.095 / .112
Dyed	lb.	.45 / .85
White	lb.	.12 / .20
Fabrifil X-24-G	lb.	.095
X-24-W	lb.	.135
Filfloc 6000	lb.	.16
F-40-9000	lb.	.105
Kalite	ton	26.00
Lead sulfate, basic	lb.	.1525/ .155
Lithopore, commercial	lb.	.055 / .065
Albalith	lb.	.055 / .0575
Astrolith	lb.	.055 / .057½
Eagle	lb.	.0725/ .075
Sunolith	lb.	.055 / .057½
Mica	lb.	.0625/ .0675
Pyrax A	ton	$11.50
W. A.	ton	13.00
Silical	ton	$7.00 /$55.00
Titanox-C, RCHT	lb.	.055 / .0575
White lead, sublimed	lb.	.085 / .09
Eagle	lb.	.085 / .0875
Whiting, limestone	ton	9.50 / 28.90
Suprex White	ton	12.00
Witco	ton	6.50
Finishes		
Black-Out	gal.	4.50 / 8.00
Flocks		
Cotton, dark	lb.	.095 / .112
Dyed	lb.	.45 / .85
White	lb.	.12 / .20
Rayon, colored	lb.	.90 / 1.50
White	lb.	.75 / 1.25
Rubber lacquer, clear	gal.	1.00 / 2.00
Colored	gal.	2.00 / 3.50
Shoe varnish	gal.	1.45
Tale	ton	11.00 / 30.00
Wax, Bees	lb.	.531 / .70
Carnauba	lb.	.881 / 1.33
Montan	lb.	.45 / .47
No. 118, colors	gal.	.86 / 1.41
Neutral	gal.	.76 / 1.31
Van Wax	gal.	1.25 / 1.30
Latex Compounding Ingredients		
Accelerator 89	lb.	1.20
122	lb.	1.30
Advawet 10	lb.	.46
Aerosol	lb.	.35
Agchem RC-30 Series	gal.	.1425/ .34
RC-169 Series	gal.	.235 / .35
SA-9	gal.	.72 / .74
-11, -21	gal.	1.10 / 1.12
-12	gal.	1.01 / 1.03
-16	gal.	.29 / .31
AgeRite Dispersions	lb.	.60 / 2.25
Antox, dispersed	lb.	.54
Aquarex BBX		
Concentrated	lb.	.78
D	lb.	.75
MDL Paste	lb.	.32
ME	lb.	.90
SMO	lb.	.50
Areskap 50	lb.	.30 / .38
100, dry	lb.	.60 / .72
Aresket 240	lb.	.30 / .38
300, dry	lb.	.60 / .72
Aresklene 375	lb.	.42 / .57
400, dry	lb.	.70 / .84
Black No. 25, dispersed	lb.	.22
Casein	lb.	.24 / .2475
Darex Copolymer No. 34L (total solids)	lb.	.445 / .50
No. X 34-L	lb.	.445 / .50
Dispersed sulfur No. 2	lb.	.10 / .12
Ethyl Thiurad	lb.	1.25
Factex Dispersion A	lb.	.185
Laton L	lb.	.075 / .0775
Marmix	gal.	1.16 / 1.35
Micronex, colloidal	lb.	.06 / .07
nHR latex chemical	lb.	1.25
Pip-Pip	lb.	1.63
R-2 Crystals	lb.	1.55
Resin V	lb.	.13
S-1	lb.	.80
Santomerse D	lb.	.43 / .65
S	lb.	.13 / .25
Setsit No. 5	lb.	.75 / 1.00
Stablex A	lb.	.90 / 1.10
B	lb.	.70 / .90
G	lb.	.40 / .50
Tepidone	lb.	.63
Tergitol wetting agents	lb.	.265 / .37
Zinc oxide, dispersed	lb.	.25
Mold Lubricants		
Aluminum stearate, precip.	lb.	.39 / .46
Aquarex D	lb.	.75
MDL Past	lb.	.32
Carbowax compounds	lbs.	.24 / .35
Colite Concentrate	gal.	.90 / 1.15
DC Mold Release Fluid	lb.	5.70 / 6.15
Emulsion No. 35	lb.	2.60 / 3.50
Glycerized Liquid Lubricant, concentrated	gal.	1.50
Lubrex	lb.	.25 / .30
Montan Wax	lb.	.45 / .47
Para Lube	lb.	.046 / .048
Rubber-Glo	gal.	.97
Sericite	lb.	.0625/ .0675
Soapstone	ton	14.00 / 30.00
Sodium stearate	lb.	.19 / .24
Odorants		
Coumarin	lb.	2.75 / 3.30
Curodex 19	lb.	4.75
188	lb.	5.75
198	lb.	6.75
Para-Dor A	lb.	2.00 / 2.50
C	lb.	2.75 / 3.25
E	lb.	.25 / .55
Rodo No. 0	lb.	4.00 / 4.50
No. 10	lb.	5.00 / 5.50
Vanillin	lb.	3.00 / 4.65
Plasticizers and Softeners		
Akroflex C	lb.	.53 / .55
Arneel HT	lb.	.30 / .35
T	lb.	.27 / .32
TO	lb.	.17 / .22
TOD	lb.	.23 / .28
Aro Lene 1980	lb.	0.10 / 0.20
Barak	lb.	.60
Bardex	lb.	$0.05 / $0.0525
Bardol	lb.	.0225/ .03
B	lb.	.05 / .0525
B.R.S. 700	lb.	.012 / .018
Barium stearate	lb.	.44 / .46
Bondogen	lb.	.55 / .60
B.R.C. No. 20	lb.	.0105/ .0115
B.R.H. No. 2	lb.	.0225/ .0235
B.R.T. No. 7	lb.	.0215/ .0235
B.R.V.	lb.	.03 / .0375
Bunarex resins	lb.	.055 / .065
Bunnatol G. S	lb.	.40 / .50
Butac	lb.	.1061/ .1436
Butyl Roleate	lb.	.16 / .195
Calcium stearate	lb.	.40 / .42
Carbonex Flakes	lb.	.03 / .035
S Flakes	lb.	.0325/ .0375
Plastic	lb.	.031 / .0335
Contogums	lb.	.0675/ .1025
Cumar EX	lb.	.0525
MH	lb.	.065 / .1175
V	lb.	.0975/ .1275
Dibenzyl phthalate	lb.	.51 / .59
Sebacate	lb.	.67 / .74
Dibutyl phthalate	lb.	.32 / .365
Sebacate	lb.	.7775/ .7925
Dicapryl phthalate	lb.	.25 / .30
Dielex B	lb.	.06
Diethyl phthalate	lb.	.315 / .385
Dimethyl phthalate	lb.	.235 / .305
Dipentene 122	gal.	.60 / .75
Dipolymer oil	gal.	.33 / .38
Dispersing oil No. 10	lb.	.045 / .0475
Double distilled cotton-seed fatty acids	lb.	.1175/ .14
Duraplex C-50 LV, 100%	lb.	.25 / .295
Dutrex 6	lb.	.025 / .0375
Emery's 0-18 Elaine	lb.	.255 / .3275
S-24	lb.	.34 / .43
Flexol Plasticizer 3GH	lb.	.55 / .60
3GO	lb.	.515 / .60
4GO	lb.	.440 / .47
8N8	lb.	.395 / .465
DOP	lb.	.379 / .424
TOF	lb.	.45 / .52
Heavy Resin Oil	lb.	.015 / .0225
Hercolyn	lb.	.1122/ .1347
Herron-H.T.	lb.	.17 / .23
Herron-Plas	lb.	.035 /
Herron-Seal	lb.	.1125/ .13
Herron-Wax	lb.	.045
No. 6	lb.	.045 / .0475
8	lb.	.0475/ .05
JMH	lb.	.65 / .68
Lead oleate	lb.	.2625
Magnesium stearate	lb.	.44 / .45
Migralube	lb.	.30
Multi-Plast	lb.	.0425/ .0475
Naftolen HV	lb.	.11 / .12
LV, MV	lb.	.0525/ .0575
R-100	lb.	.11 / .12
Neo-Fat H.E.O.	lb.	.21 / .22
1-60	lb.	.20 / .21
1-65	lb.	.24 / .25
Neoprene Peptizer P-12	lb.	.75 / .83
Nevillac 10°	lb.	.24
Neville 465 Resin	lb.	.035
R Resins	lb.	.085 / .1375
Nevinol	lb.	.13
Nevoll	lb.	.02 / .025
Nextex 10	lb.	.0775/ .08
90	lb.	.20
No. 1-D heavy oil	lb.	.04
Palmalene	lb.	.15
Para Resins 2457, 2718	lb.	.04
Paradene Nos. 1, 2	lb.	.0525
Nos. 33, 34	lb.	.0625
No. 35	lb.	.0575
Para Flux, regular	gal.	.17 / .19
No. 2016	gal.	.19 / .20
Para Lube	lb.	.046 / .048
Paranlex A1-111	lb.	.21 / .25
G-25, 100%	lb.	.75
Paroils	lb.	.0975/ .18
Picco 75	lb.	.105
100	lb.	.105 / .155
Piccolizer 30	lb.	.055 / .06
Piccolastic Resins	lb.	.125 / .205
Piccolyte Resins	lb.	.17 / .205
Piccoumaron Resin 427	lb.	.11 / .16
Resins	lb.	.0625/ .11
Piccovars	lb.	.11 / .115
Piccovol	lb.	.02 / .0275
Pictar	gal.	.18 / .23
Plasticizer 35	lb.	.205 / .24
36	lb.	.305 / .34
1889	lb.	.565
1919	lb.	.55
2069	gal.	.21 / .23
2070	gal.	.25 / .27
B	lb.	.35 / .45
SC	lb.	.75
Plastoflex No. 10	lb.	.20
No. 20	lb.	.25
Plastogen	lb.	.0775/ .08
Plastone	lb.	.27 / .30
R-19, R-21 Resins	lb.	.1075
Reogen	lb.	.115 / .12
Resin C pitch	lb.	.015 / .021
R6-3	lb.	.38 / .40
Resinex	lb.	.0275/ .0325
L-4	lb.	.0175/ .025
Ridho 369	lb.	.08 / .09
369-F	lb.	.12

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ASTROLITH
LITHOPONE

ZOPAQUE
TITANIUM DIOXIDE

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All shades of Cadmolith Colors are available for prompt shipment... *Your inquiry is invited.*

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Proved results for better compounding of synthetic or natural

The recognized standard of Quality Pigments for The Rubber Industry

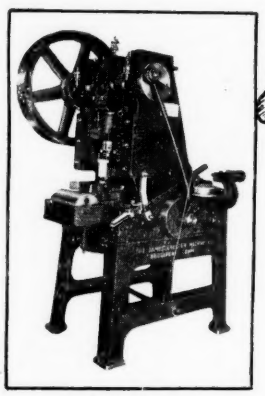
THE CHEMICAL & PIGMENT COMPANY

Division of
The Glidden Company
BALTIMORE, MD. COLLINSVILLE, ILL.
OAKLAND, CALIF.

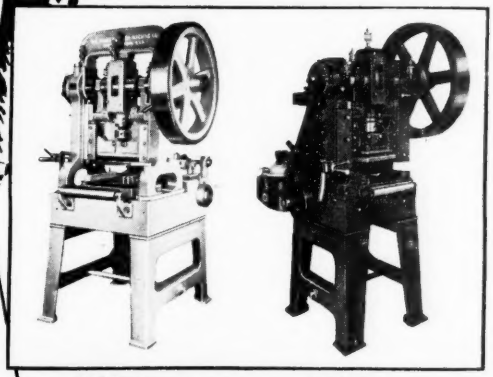
PROVEN... BY COUNTLESS NEW USERS

COULTER
RUBBER CUTTING MACHINES

NEW Proven features for continuous volumetric control and stripping for HEELS-SOLES-TAPS and other molded products.



MODEL A-1



MODEL A-2 MODEL A-3

- Model A-1 For HEELS at high speed production, or short runs.
- Model A-2 For Multiple HEELS, HALF and FULL SOLES with stock grain.
- Model A-2S (Not Illustrated) For cutting crosswise of grain of stock.
- Model A-3 For Multiple HEELS and TAPS with or across stock grain.

Here is the *Rubber Cutting Machine* that will *cut with* or across the stock grain, either singular or in multiples—from a strip of stock direct from the warming mill.

WRITE FOR FULL PARTICULARS

Production Machines Since 1896

The James COULTER *Machine Co.*
BRIDGEPORT • CONNECTICUT • U.S.A.

RPA No. 2	lb.	$0.65
No. 3	lb.	.46
No. 5	lb.	.57
RSN Flux	gal.	.10 / $0.19
Rubberol Compound	lb.	.185
Santicizer B-16	lb.	.52 / .57
E-15	lb.	.49 / .54
M-17	lb.	.46 / .51
No. 140	lb.	.3225/ .38
Sebacic acid	lb.	.48 / .55
Solvenol	gal.	.56 / .58
Staybelite Resin	lb.	.06 / .065
Stearex Beads	lb.	.147½/ .15⅞
Stearic acid, single pressed	lb.	.235 / .235
Double pressed	lb.	.23 / .24
Triple pressed	lb.	.2525/ .2625
Stearite	lb.	.147½
Synprolac	lb.	.185 / .195
Synprowax	lb.	.16
Syn Tac	lb.	.33 / .35
Synthol	lb.	.225
TR-11	lb.	.035
Tricresyl phosphate	lb.	.3225/ .38
Turgum S	lb.	.0886/ .1086
Tysonite	lb.	.215 / .2225
Vistac No. 1	lb.	1.21 / 1.41
No. 2	lb.	1.61 / 1.75
Wilmac D-X	lb.	.09 / .10
X-1 resinous oil	lb.	.011 / .016
XX-100 Resin	lb.	.0525
Zinc laurate	lb.	.45 / .46

Reclaiming Oils

Bardex	lb.	.05 / .0525
Bardol	lb.	.0225/ .03
B	lb.	.05 / .0525
B.R.H. No. 2	lb.	.0225/ .0235
B.R.T. No. 3	lb.	.019 / .02
No. 4	lb.	.02 / .021
B.R.V.	lb.	.03 / .0375
BWH-1	lb.	.11
Dipentene 122	gal.	.60 / .75
Dipolymer oil	gal.	.33 / .38
Dispersing Oil No. 10	lb.	.045 / .0475
Heavy Resin Oil	lb.	.015 / .0225
LX-83	gal.	.15 / .23
-572	gal.	.20 / .28
No. 1 heavy oil	lb.	.04
No. 1621	lb.	.02 / .0275
Picco C-6, -28, -32	gal.	.33 / .38
33	gal.	.19 / .24
D-4	gal.	.19 / .24
E-5	gal.	.17 / .22
No. 523 H.S. oil	gal.	.22 / .27
Solvenol	gal.	.56 / .58
S.R.O.	lb.	.015 / .0225
Wilcor Nos. 111, 151	gal.	.26 / .30
X-60 Solvent	gal.	.20 / .28
X-443	gal.	.20 / .27

Reinforcers, Other Than Carbon Black

B.R.C. No. 20	lb.	.0105/ .0115
Bunarex 50, 75, 100, 115	lb.	.055 / .065
Calcene T	ton	40.00 / 50.00
Carbonex, flakes	lb.	.03 / .035
S Flakes	lb.	.0325/ .0375
Plastic	lb.	.031 / .0335
Clays		
Aerfloted Hi-White	ton	10.00
Paragon	ton	10.00
Suprex	ton	11.00 / 23.50
Aluminum flake	ton	15.50 / 25.50
Barden	ton	12.00
Buca	ton	40.00
Catalpo	ton	30.00
China	ton	9.00 / 16.00
Dixie	ton	13.00
Hydratex R	ton	22.00
Hydrowhite	ton	15.00
L.G.B.	ton	16.00
Paragon (R)	ton	11.00
Pigment No. 33	ton	30.00
Witco Nos. 1, 2	ton	25.00
Cumar EX	lb.	.0525
MH	lb.	.065 / .1175
V	lb.	.0975/ .1275
Darex Copolymer No. 3	lb.	.395 / .42
No. X 34	lb.	.45 / .475
G Resin	lb.	.08
Good-Rite Resin 50	lb.	.415 / .455
Kalvan	ton	100.00
Magnesia, Calcined		
Extra light, U.S.P.	lb.	.31 / .33
Light, technical	lb.	.28
No. 101	lb.	.175
Heavy, technical	lb.	.05 / .1275
Medium light, technical	lb.	.12
Magnesium carbonate	lb.	.0725/ .1175
Marbon S, S-1	lb.	.52 / .65
Type B	lb.	.65 / .75
Naftex EPC-80	lb.	.0825/ .1125
HMF-67	lb.	.0656/ .0838
-75	lb.	.07 / .09
MPC-80	lb.	.0825/ .1125
SRF-67	lb.	.0556/ .0736
-75	lb.	.0576/ .0778
Neville R Resins	lb.	.085 / .1375
Para Resins 2457, 2718	lb.	.04
Picco 75	lb.	.105
100	lb.	.105 / .155
Piccolyte Resins	lb.	.17 / .205
Piccoumaron Resins	lb.	.0625/ .11
Piccovars	lb.	.11 / .115
Resin C Pitch	lb.	.015 / .021
Resinex	lb.	.0275/ .0325
Silene EF	lb.	.055 / .06
Witcarb R	ton	$100.00
R-12	ton	32.50
Zinc oxide, commercial†	lb.	.095 / $0.135

Retarders

Armeen HTD	lb.	.43 / .53
Cumar RH	lb.	.105
Delac T	lb.	.55 / .60
E-S-E-X	lb.	.34 / .39
M-B-T	lb.	.34 / .39
M-B-T-S	lb.	.39 / .44
R-17 Resin	lb.	.1075
Retarder W	lb.	.36
Retardex	lb.	.475
RM	lb.	1.25
Thionex	lb.	1.25
Thiuram E, M	lb.	1.25
Vultrol	lb.	.50 / .55

Solvents

Benzol, industrial	gal.	.19 / .24
Bondogen	lb.	.55 / .60
Carbon bisulfide	lb.	.055 / .085
Tetrachloride	lb.	.065 / .095
Cosol No. 1	gal.	.26 / .34
No. 2	gal.	.25 / .33
GVL	lb.	1.00
Nevsol	gal.	.185 / .25
Picco Solvents	gal.	.115 / .27
Skellysolve-B	gal.	.105
C	gal.	.10
R	gal.	.081
Tollac	gal.	.195 / .25
Toluol, industrial	gal.	.22 / .28
2-50-W Hi-Flash Solvent	gal.	.25 / .30
X-60 Solvent	gal.	.20 / .28
Xylol, industrial	gal.	.24 / .43

Synthetic Rubbers

Butaprene NF	lb.	.45 / .60
NL	lb.	.46 / .53
NXM	lb.	.50 / .65
Chemigum Latex Type		
101 (solids weight)	lb.	.37 / .40
Chemigum N-1	lb.	.53 / .60
Hycar Latex (dry weight)		
OR-15	lb.	.455 / .57
OR-25	lb.	.385 / .46
Hycar OR-15	lb.	.47 / .505
OR-25, OS-10	lb.	.40 / .435
Neoprene Latex (dry weight)		
Type 60	lb.	.32 / .37
571	lb.	.25 / .30
572	lb.	.28 / .33
601	lb.	.30 / .35
700	lb.	.30 / .35
842	lb.	.27 / .32
Neoprene Type AC	lb.	.50
GG	lb.	.50
E, M	lb.	.65
FR, KNR	lb.	.75
NC	lb.	.35
Paraplex X-100	lb.	1.00
Perbunan 18	lb.	$0.39 / $0.425
26	lb.	.40 / .435
35	lb.	.47 / .505
Latex Type II (55%)	lb.	.38 / .42
Silastic		
Coating and laminating grades		
Nos. 120, 125	lb.	3.80 / 4.40
Molding and extrusion grades		
Nos. 150, 180	lb.	3.35 / 3.95
160, 167	lb.	2.90 / 3.50

Tackifiers

Bunarex 10, 25, 40	lb.	0.055 / 0.065
Hercolyn	lb.	.1122/ .1347
Koresin	lb.	.40 / .52
Nevillac	lb.	.17 / .19
Nevilloid C-55	lb.	.12
Nevindene	lb.	.105 / .135
Piccolastic Tackifiers	lb.	.20 / .205
Piccolyte Resins	lb.	.17 / .205
Piccoumaron Resin 427	lb.	.11 / .16
Resins	lb.	.0625/ .11
Staybelite Resin	lb.	.06 / .065
Synthetic 100	lb.	.41
Synthol	lb.	.225
Vistac No. 1	gal.	1.21 / 1.41
No. 2	gal.	1.61 / 1.75
Vistanex	lb.	.32 / .36

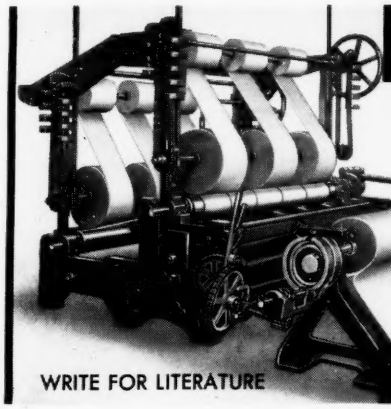
Vulcanizing Agents

Dibenzo G-M-F	lb.	1.50
Ethyl Selenac	lb.	1.60
Tuads	lb.	1.25
G-M-F	lb.	1.95
Litharge, commercial	lb.	.166 / .175
Eagle, sublimed	lb.	.17 / .175
FBS	lb.	.17 / .175
Magnesia, Calcined		
Extra-light, U.S.P.	lb.	.31 / .33
Carey	lb.	.28
Light, technical	lb.	.22 / .28
No. 101	lb.	.175
Heavy, technical	lb.	.05 / .31
Medium-light, technical	lb.	.175
Methyl Selenac	lb.	1.60
Tuads	lb.	1.25
Red lead, commercial	lb.	.176 / .19
Eagle	lb.	.18 / .185
#2 RM	lb.	.18 / .185
Sulfur flour, commercial	100 lbs.	1.80 / 2.15
Crystex	lb.	.32 / .45
Dichloride	lb.	.03 / .085
Insoluble 60	lb.	.16
Monochloride	lb.	.03 / .085
Rubbermakers	100 lbs.	2.15 / 2.60
Telloy	lb.	2.00
Vandex	lb.	2.00
Vultac Nos. 1, 2	lb.	.38 / .45
No. 3	lb.	.42 / .49
White lead silicate	lb.	.16 / .175
Eagle	lb.	.1635/ .1685

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, and Inventory—June, 1947—May, 1947—First Six Months 1947—1946

	1947				1946
	June	% of Change from Preceding Month	May	First Six Months	First Six Months
PASSENGER CASINGS					
Shipments					
Original equipment	1,715,660		1,602,785	9,685,042	3,528,007
Replacement	4,344,848		4,097,022	25,795,070	26,850,895
Export	145,800		189,652	843,834	269,633
Total	6,206,308	+5.38	5,889,459	36,323,946	30,648,535
Production	6,102,243	—6.49	6,525,781	39,630,113	30,942,843
Inventory end of month	4,834,015	—4.07	5,038,888	4,834,015	2,263,259
TRUCK AND BUS CASINGS					
Shipments					
Original equipment	414,427		402,075	2,862,089	1,553,970
Replacement	748,838		820,455	4,800,220	5,601,400
Export	156,024		171,335	846,547	392,681
Total	1,319,289	—5.35	1,393,865	8,508,856	7,548,051
Production	1,480,506	—6.20	1,578,322	9,390,474	7,779,745
Inventory end of month	1,510,517	+8.91	1,387,002	1,510,517	1,012,288
TOTAL AUTOMOTIVE CASINGS					
Shipments					
Original equipment	2,130,087		2,004,860	12,547,131	5,081,977
Replacement	5,093,686		4,917,477	30,595,290	32,452,295
Export	301,824		360,987	1,690,381	662,314
Total	7,525,597	+3.33	7,283,324	44,832,802	38,196,586
Production	7,582,749	—6.43	8,104,103	49,020,587	38,722,588
Inventory end of month	6,344,532	—1.27	6,425,890	6,344,532	3,276,147
PASSENGER AND TRUCK AND BUS TUBES					
Shipments					
Original equipment	2,154,738		1,979,664	12,543,481	5,088,355
Replacement	3,364,183		3,267,955	22,956,825	27,014,006
Export	260,400		323,235	1,525,157	625,617
Total	5,779,321	+3.74	5,570,854	37,025,463	32,727,978
Production	5,440,047	—5.43	5,752,429	42,766,855	33,972,631
Inventory end of month	9,252,463	—5.32	9,771,746	9,252,463	4,403,735

NOTE: Cumulative data on this report includes adjustments made in prior months.
SOURCE: Rubber Manufacturers Association, Inc.



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OTS Bibliography Reports on Rubber Products—VIII

THE abstracts printed below are taken from the Department of Commerce's weekly publication, "Bibliography of Scientific and Industrial Reports." Copies of the complete reports, either on microfilm or as photostats, as indicated, may be obtained from the Office of the Publication Board, United States Department of Commerce, Washington 25, D. C.

Accelerators and Age Resisters. A. E. Boss. (ORR Report No. CC-37.) PB-13338. August, 1945. 19 pages. Photostat $2; microfilm 50¢. A translation excerpt from an I. G. Farben sales bulletin entitled, "Handbook for the Rubber Industry," gives a short description of the various products made by I. G. for the rubber industry. The section translated deals with the identification of various accelerators and age resisters.

The Structure of the Oppauer Butadiene-Emulsion Rubber. Dr. Daniel. PB-18292. 27 pages. Photostat $2; microfilm 50¢. The butadiene polymer contained in the emulsion polymerized rubber owes its favorable stress and tensile strengths to the presence of 20-30% by weight of oleic acid in the raw polymer. Many other additives give similar results. The colloidal structure of the rubber is comparable to that of natural rubber. Many graphs are appended. (The report is in German.)

Testing of Rubber. Deutscher Verband fur die Material Prufungen der Technik. PB-18300. 1936-1941. 20 pages. Photostat $1; microfilm 50¢. The report covers rubber testing methods for determining tensile strength, artificial aging, abrasion resistance, and hardness of soft rubber; tear resistance; hardness of finished products; and various chemical properties.

Testing of Rubber. I. G. Farbenindustrie. PB-18299. January, 1935. 16 pages. Photostat $1; microfilm 50¢. A letter from I. G. confirms the receipt of a five-blade cutter for rubber test pieces with cutting patterns. Errors resulting from imperfectly cut pieces are described, and tabulations and graphs of the tests are furnished in an appendix.

Status of Methods of Application and Use in the Synthetic Rubber Field. E. Konrad. (ORR Report No. CR-791, CD-440.) PB-13355. August, 1945. 54 pages. Photostat $4; microfilm $1. Addresses by the technical director of the I. G. rubber laboratories at Leverkusen are translated. The first address, delivered September 26, 1940, deals with the properties and uses of the different Buna rubbers. The second address, given May 28, 1942, reports further on applications of Buna, including comparison with practices in the United States. The third address, delivered March 1, 1944, includes a treatise on new types of Buna. Charts and graphs illustrate the report.

Report on the Leverkusen Works of I. G. Farben. J. W. Livingston. (CIOS Report File XXXI-76, Item 22.) PB-16714. June, 1945. 23 pages. Photostat $2; microfilm 50¢. The Leverkusen plant is a small producer of Buna rubbers, having a monthly capacity of 600 tons. The plant produces Buna N or Perbunan (several types), Buna SS, Buna SSE, Buna SSGF, and Buna SW. Of chief interest are the large research laboratory, the rubber testing laboratory, and the experimental tire plant. Information was obtained on the physical properties of Buna SW and a new rubber, Saurem Buna, which Leverkusen chemists believe to be better than Buna S-3. Information was also obtained on the lines along which Leverkusen is conducting research to improve the Bunas.

Properties and Analysis of German D-52 Latex. S. H. Maron and others. (ORR Report CD-535, CR-904.) PB-13360. 8 pages. Photostat $1; microfilm 50¢. This report describes the results of investigations of the properties and composition of a sample of German D-52 latex. D-52 and Igetex are very similar in all respects except pH, total solids, and viscosity. The higher value of the latter may possibly be due to the higher solids content. The properties of D-52 approximate more closely those of GR-S Latex Type III than those of GR-S Latex Type II, despite the fact that the combined styrene content is essentially identical with that in Type II latices. Figures include a flow sheet of D-52 latex analysis, and absorption curves for Nekal fractions in Ingetex and D-52 latices.

General Summary of Production and Use of Reclaimed Rubber in Germany. Rubber Bureau, WPB, and Office of Rubber Reserve, RFC. (ORR Report CC-43.) PB-13337. August, 1945. 14 pages. Photostat $1; microfilm 50¢. The Germans had not developed any new techniques or found any outstanding plasticizers for reclaiming Buna S scrap. Nor was there evidence that much research work had been done on the problem. The conventional refiner generally used was the two-roller, but a three-roll Vogel vertical-type refiner was considered superior. Enclosed is a diagram showing the surface ratios of this roller.

Summary Report: German Synthetic Insulation for Wire and Cable. Rubber Bureau, WPB, and Office of Rubber Reserve, RFC. (ORR Report CC-42.) PB-13339. August, 1945. 28 pages. Photostat $2; microfilm 50¢. This report covers the use of synthetic rubbers for insulation. Mention is made of Buna S, Buna N, and numbered Buna rubbers for specific purposes. Very little experimental work was done on Butyl and neoprene, but polyvinyl chloride and polystyrene were in use. Compounding materials are mentioned, and the placing of the insulation on the wire and cable is discussed.

Summary Report on the Production and Performance of German Synthetic Tires and Other Transportation Items. Rubber Bureau, WPB, and Office of Rubber Reserve, RFC. (ORR Report CC-31.) PB-13336. August, 1945. 89 pages. Photostat $6; microfilm $1. This is a comprehensive survey of the German rubber industry. The three producers visited were Continental Gummiwerke A.G. (Hanover), Harburger Gummiwaren Fabrik Phoenix A.G. (Harburg), and Deutsche Dunlop Gummi Compagnie A.G. (Hanau). German tire production is treated at length, and all stages of tire manufacture are considered, including mixing, stock preparation, tire building, and tire curing. Tires for all types of vehicles are discussed, as are the various tire parts. American tests of these German tires appear. American investigators believe that the German tires are no better, and probably not so good as American tires with identical natural rubber content. Buna inner tubes were defective owing to a lack of natural rubber, and the Germans evidently had little knowledge of our Butyl and neoprene tube developments. Fabric used was rayon, which they preferred to cotton. German Buna was hard to handle. Reclaiming of rubber was not advanced. Buna S was being replaced by Buna S-3. Buna SS and Perbunan were important developments. Two compounding materials, Koresin and Plasticator No. 32, may have important uses. Other information given includes descriptions of the Buna types with their average Defo plasticity values; the various latices; and Igetex N and NN.

Heat Sensitization of Buna Latices. Sinn. (ORR Report CR-831 and CD-491.) PB-13359. September, 1945. 23 pages. Photostat $2; microfilm 50¢. This document, by Dr. Sinn of Central Rubber Laboratory, Group 2, I. G. Leverkusen, is dated March 6, 1940, and is translated by Dr. S. H. Maron. The German synthetic latices are specifically dealt with and should have bearing on possible uses of GR-S latices. The studies were concerned with coagulation of the various forms of latex by heat and weak coagulants.

Styrene Production at Huls, Germany. Office of Rubber Reserve, RFC. (TIIC Rubber Subcommittee Report RM-303.) PB-13362. September, 1945. 12 pages. Photostat $1; microfilm, 50¢. The Huls Buna Works is the second largest Buna S plant in Germany. Its capacity is 4,000 tons a month of Buna S-3, and it has an equivalent capacity for the intermediate products, including styrene. Hydrocarbon gases are cracked in an electric arc to acetylene and hydrogen, which are used in the production of butadiene and styrene. Styrene production processes and Buna S-3 continuous polymerization procedures are similar to those used at Schkopau and Ludwigshafen.

Styrene Production at Schkopau, Germany. Office of Rubber Reserve, RFC. (TIIC Rubber Subcommittee Report RM-304.) PB-13361. September, 1945. 8 pages. Photostat $1; microfilm 50¢. The I. G. Farben Buna Works at Schkopau is the largest synthetic rubber plant in Germany, with a capacity of 6,000 tons a month of Buna S-3. In this plant calcium carbide is used to produce acetylene, which is then used in the production of butadiene and styrene. Buna S-3 is produced from butadiene, styrene, Nekal, synthetic fatty acid (produced from paraffin oxidation), and other purchased chemicals. The function of ethylbenzene is related.

Styrene Production in Germany. Office of Rubber Reserve, RFC. (TIIC Rubber Subcommittee Report RM-284.) PB-13364. August, 1945. 22 pages. Photostat $2; microfilm, 50¢. The four largest German producers of Buna S are located at Ludwigshafen, Huls Schkopau, and Auschwitz (last not completed), and all have similar processes for styrene and ethylbenzene. The conversion of ethylbenzene to styrene is carried out catalytically in the presence of a zinc oxide base, and the total yield is 90% of theoretical. Flow sheets, charts, and drawings of production processes are included.

Continental Gummi Werke—"Excelsior" Factory, Limmer, Hanover. Glen Gay. (BIOS Final Report 172, Items 8, 22.) PB-20462. February, 1946. 13 pages. Photostat $1; microfilm 50¢ This factory produced soles, heels, gas masks, sponge and cellular rubber, latex dipped goods, clothing, etc. The processes for heat softening Buna, and the manufacture and testing of gas masks, coated fabrics, soling and heels are described. Mixes used in the manufacture of these products are given. Tear and abrasion tests also appear.

Isoprene Polymers. I. G. Farbenindustrie. PB-16327. January, 1941. 3 pages. Photostat $1; microfilm 50¢. Experiments from 1927 to 1931 indicated that isoprene was inferior to butadiene in tensile strength and elongation. Tests made with Oppanol, however, showed that the properties of a polymer depended upon the purity of the monomer used. New tests conducted on a purer isoprene showed again that isoprene was inferior to butadiene. Substituting isoprene for part of the butadiene in mixed polymers offered no advantages. A table compares the properties of styrene, butadiene, and isoprene polymers. (In German.)

Recommendation for the Mixing of Perduren L. I. G. Farbenindustrie. PB-19330. June, 1937. 9 pages. Photostate $1; microfilm 50¢.. This advertising pamphlet describes Perduren L as a valuable material for the production of oil and gasoline-resistent synthetic rubber goods. Owing to its content of combined sulfur, Perduren L may be vulcanized either with or withot additional sulfur. Mixing directions are given for a number of different stocks, with formulations and curing cycles. (In German.)

Polymerization Method. I. G. Farbenindustrie. PB-17618. March, 1943. 8 pages. Photostat $1; microfilm 50¢. This draft for a German patent application refers to the method of producing synthetic rubber by polymerizing diene hydrocarbons either alone or in mixture with other polymerizable compounds by means of oxygen-yielding catalysts in aqueous emulsion. The patent claims protection for polymerization in the presence of non-polymerizable water-insoluble solvents and admixtures of soluble organic sulfur compounds. (In German.)

Regeneration of Reclaimed Rubber. I. G. Farbenindustrie. PB-19328. August, 1939. 4 pages. Photostat $1; microfilm 50¢. This is a brief review of the alkali, high-pressure steam, retort, acid, and plastization processes used for regenerating reclaimed rubber. Also described are the classification of reclaimed rubber into fabric-containing and fabric-free material, the quantities of mineral oil to be added during milling, and the vulcanization process. (In German.)

Process for the Cementing of Synthetic Rubbers. I. G. Farbenindustrie. PB-16348. May-July, 1942. 8 pages. Photostat $1; microfilm 50¢. An intended patent application for a process for cementing mixed polymers from butadiene carbohydrates and vinyl methyl ketone and, if need be, additional polymerizable materials. The synthetic rubbers may be cemented to one another or to other materials; the cement has a cellulose ester base. Cohesan or Kohesan, a solution of nitrocellulose containing a plasticizer, is given as an example. (In German).

Method of Accelerating the Polymerization of Synthetic Rubber. I. G. Farbenindustrie. PB-17615. June, 1942. 3 pages. Photostat $1; microfilm 50¢. This draft of a German patent application refers to the polymerization of butadiene hydrocarbons mixed with other polymerizable materials. Protection is claimed for the carrying out of the polymerization in the presence of up to 5% of acrylic or methacrylic acid esters. (In German.)

(*Continued on page 856*)

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Production, Compounding, and Evaluation of German Buna S Type Rubber. E. R. Weidlein, Jr., and R. W. KixMiller. (ORR Report CD-363, CR-693.) PB-13340. April 21, 1945. 76 pages. Photostat $6; microfilm $1. This report summarizes the latest information available on technical details of the production and use of German synthetic rubber. It also includes a considerable amount of information on the relative quality and characteristics on different types of German synthetics and compounding materials. Softening procedures and compounding techniques are also discussed.

The Heating of Passenger Automobile Tires with Relation to Speed and Tire Pressure. H. P. Zoeppritz and W. Sander. (ALSOS Mission RFR 311.) PB-18396. May, 1944. 78 pages. Photostat $6; microfilm $1. The investigation of heating of tires by proof stand methods was conducted on level endless belts and on revolving drums. Results of tests by both methods are compared. It was seen that the temperature depended upon the rate of speed and other considerations, such as external temperature, length of run, load, composition of tire, etc.

(To be continued)

United States Rubber Industry Employment, Wages, and Hours

All Rubber Products

Month	Prod. Workers '000's	Prod. Worker Index	Prod. Worker Payroll Index	Avg. Weekly Earnings	Avg. Weekly Hours	Avg. Hourly Earnings	Consumers' Price Index
1946							
Apr.	217	179.1	319.7	$49.67	40.3	$1.23	..
May	217	179.7	322.1	49.82	39.4	1.27	131.7
June	221	182.9	331.4	50.45	39.3	1.28	133.3
July	214	177.0	321.4	50.60	39.2	1.29	141.2
Aug.	223	184.0	336.9	51.03	39.4	1.30	144.1
Sept.	229	189.1	363.9	53.69	40.6	1.32	145.9
Oct.	236	194.8	361.9	51.74	39.4	1.31	148.6
Nov.	240	198.8	377.4	52.93	40.0	1.33	152.2
Dec.	242	200.1	392.2	54.63	41.1	1.33	153.3
1947							
Jan.	240	198.8	386.3	54.03	40.6	1.33	153.3
Feb.	240	198.2	385.0	54.06	40.6	1.33	153.2
Mar.	238	196.5	374.3	53.00	39.8	1.33	156.3
Apr.	234	193.5	383.9	55.37	39.6	1.40	156.1
May	223	183.2	371.2	..	..	..	155.8
Year 1939	121	100.0	100.0	27.84	36.9	0.75	100.7
1943	194	160.3	263.9	..	..	..	115.8

Tires and Tubes

1946						
Apr.	104.0	192.8	312.9	$54.77	38.6	$1.41
May	104.7	193.4	314.2	54.72	37.7	1.45
June	106.0	195.8	318.3	54.82	37.4	1.46
July	99.1	183.1	304.3	56.11	38.0	1.47
Aug.	102.8	189.9	311.2	55.42	37.4	1.47
Sept.	106.6	197.0	348.9	59.89	39.6	1.51
Oct.	110.4	204.0	346.1	57.38	38.2	1.49
Nov.	112.0	207.0	360.3	58.87	39.0	1.50
Dec.	111.7	206.3	368.9	60.46	39.8	1.51
1947						
Jan.	110.1	203.5	361.2	59.78	39.5	1.51
Feb.	108.9	201.2	357.7	59.90	39.3	1.52
Mar.	107.8	133.1	343.7	58.01	38.1	1.52
Apr.	105.5	194.9	357.1	61.64	38.2	1.61
May	..	..	..	..	..	..
Year 1939	54.1	100.0	100.0	33.36	35.0	.96
1943	86.7	160.2	256.3	..	..	..

Boots and Shoes

1946						
Apr.	..	..	..	$43.75	42.1	$1.04
May	17.8	120.0	236.0	44.19	41.5	1.07
June	18.1	122.2	244.8	44.98	41.8	1.08
July	17.5	118.4	226.6	42.98	39.6	1.09
Aug.	18.0	121.3	240.2	44.45	41.2	1.08
Sept.	18.1	121.9	245.8	45.27	41.5	1.09
Oct.	18.4	123.9	214.8	38.93	37.3	1.04
Nov.	19.2	129.6	253.7	43.80	40.4	1.08
Dec.	19.7	132.7	272.6	45.93	42.0	1.09
1947						
Jan.	19.9	133.9	276.0	46.06	41.9	1.10
Feb.	20.3	136.8	280.6	45.83	42.0	1.09
Mar.	20.2	136.5	274.3	44.91	41.2	1.09
Apr.	19.9	134.6	276.3	45.87	40.6	1.13
May	..	..	..	..	..	..
Year 1939	14.8	100.0	100.0	22.80	37.5	0.61
1943	21.8	147.1	246.4	..	..	..

Rubber Goods, Other

1946						
Apr.	..	..	..	$43.45	42.6	$1.02
May	67.0	129.4	241.4	44.01	41.5	1.06
June	68.5	132.3	255.2	45.44	41.7	1.09
July	69.3	133.8	255.9	44.93	40.8	1.10
Aug.	72.1	139.4	277.7	46.85	41.8	1.12
Sept.	73.3	141.6	282.4	47.01	41.8	1.13
Oct.	74.8	144.5	288.5	47.00	41.6	1.13
Nov.	76.2	147.1	292.4	46.74	41.4	1.13
Dec.	77.0	148.7	308.6	48.68	42.6	1.14
1947						
Jan.	76.6	148.0	303.4	48.12	42.0	1.14
Feb.	76.4	147.6	302.8	48.27	42.1	1.15
Mar.	75.5	145.9	298.6	42.38	41.9	1.16
Apr.	74.6	144.1	297.8	48.55	41.2	1.19
May	..	..	..	..	..	..
Year 1939	51.8	100.0	100.0	23.34	38.9	0.61
1943	73.1	141.3	234.5	..	..	..

Source: United States Department of Labor, Washington, D. C.

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	July, 1947
15" & 16" D.C. Passenger	
15x4.00E	18,212
16x4.00E	434,267
16x4.50E	228,764
15x5.00E	207,243
16x5.00F	19,292
15x5.50F	78,887
16x5.50F	4,099
16x6.00F	1,428
16x4.00E—Hump	318,569
15x4.50E—Hump	54,754
16x4.50E—Hump	14,052
15x5.00F—Hump	15,637
15x5.50F—Hump	1,453
15x5-K	23,771
16x5-K	118,157
15x5½-K	6,913
16x5½-K	15,135
15x6-L	28,450
16x6-L	39,370
15x6½-L	33,630
17" & Over Passenger	
18x2.15B	3,504
Truck	
17x4.33R	16,730
20x4.33R	20,291
17x5.0	28,511
18x5.0	3,366
20x5.0	30,789
17x5.00R	3,080
20x5.00R	5,076
20x5.00S	227,213
24x5.00S	1,827
17x6.0	1,080
20x6.0	45,478
20x6.00S	16,269
18x6.00T	2,572
20x6.00T	67,494
18x7.33V	573
20x7.33V	32,732
22x7.33V	13,702
24x7.33V	838
20x7.5	4,742
24x8.37V	258
Semi D. C. Truck	
16x4.50E	2,876
15x5.50F	18,043
16x5.50F	53,539
16x6.50H	1,984
Tractor & Implement	
12x2.50C	18,906
12x3.00D	23,272
15x3.00D	11,337
16x3.00D	4,310
19x3.00D	7,547
21x3.00D	1,551
24x3.00D	556
36x3.00D	3,072
40x3.00D	559
17x3.25E	620
21x3.25E	544
16x4.25KA	415
13x5.50F	684
18x5.50F	17,268
20x5.50F	2,381
24x6.00S	3,043
W6-24	2,315
W7-24	1,315
W8-24	23,400
W8-32	3,114
W9-24	1,871
W9-28	2,488
W9-38	3,021
W10-24	4,798
W10-28	3,076
W10-36	5,138
W10-38	1,640
W11-24	1,995
W11-32	249
DW8-42	1,461
DW9-38	9,300
DW10-38	236
DW11-28	8,490
DW11-38	4,508
DW12-30	2,251
DW12-34	432
Earth Mover	
20x11.25	360
24x11.25	25
20x13.00	5
24x13.00	154
24x15.00	270
25x15.00	639
25x17.00	232
33x22.00	66
Total	2,443,564

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.25 per line (ten words)	Light face type 40c per line (ten words)	Light face type $1.00 per line (ten words)
Bold face type $1.60 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.40 per line (eight words)
Allow nine words for keyed address.		*Replies forwarded without charge*

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN

GENERAL MANAGER FOR MEDIUM-SIZED, MIDWESTERN rubber plant. Background in dipped goods production and personnel matters essential. Indicate experience and salary required. Correspondence strictly confidential. Address Box No. 920, care of INDIA RUBBER WORLD.

DEVELOPMENT CHEMIST—YOUNG MAN WITH COMPOUNDing experience for manufacturer of Tires, Tubes, Hose, V-Belts, and Shoe Soling Materials in Southern New England area. State age, education, experience, and minimum salary requirements in first hand-written letter. Address Box No. 921, care of INDIA RUBBER WORLD.

DEVELOPMENT CHEMIST, FOR LATEX COMPOUNDING. GIVE full information including education, experience, and salary desired in first letter. Eastern location. Address Box No. 922, care of INDIA RUBBER WORLD.

CHEMIST WITH MANUFACTURING EXPERIENCE IN MOLDING rubber items and bonding to metal to take full charge of production for small plant in Pennsylvania. Address Box No. 923, care of INDIA RUBBER WORLD.

SUPERINTENDENT FOR MECHANICAL RUBBER GOODS plant located in Canada. Molded, extruded, and sponge products. State experience and salary expected. Replies treated confidentially. Address Box No. 924, care of INDIA RUBBER WORLD.

WANTED: SALESMAN FOR RUBBER ELASTIC THREAD AND covered elastic yarn. With knowledge of webbings, braids, knitted fabrics, etc. State age, selling and other experience, salary desired. Factory located in New England. Address Box No. 925, care of INDIA RUBBER WORLD.

WANTED: EXPERIENCED MAN IN FORMULATION AND APplication of vinyl coatings on textiles for laboratory and sales service work. Address Box No. 926, care of INDIA RUBBER WORLD.

WANTED: A SUPERINTENDENT QUALIFIED TO TAKE FULL charge of spreader room with small rubber coating plant in Massachusetts. Must have experience in compounding of rubber and lacquers. Give full details of your experience. Address Box No. 932, care of INDIA RUBBER WORLD.

BERLOW AND SCHLOSSER CO.

Consultation and Technical Service
Paper, Textile and Wringer Rolls—Mechanicals
Molded Specialties—Cut Rubber Thread
537 INDUSTRIAL TRUST BUILDING, PROVIDENCE 3, R. I.

PHILIP TUCKER GIDLEY

CONSULTING TECHNOLOGIST — RESEARCH IN RUBBER

Chemical and physical tests, formulas, product development, new plant construction, and engineering.

Fairhaven **Massachusetts**

SITUATIONS WANTED

SALESMAN, SUPERVISOR, YOUNG MARRIED MAN—WILL travel anywhere. Experienced in both scrap rubber and plastic fields. Warehouse or factory position acceptable. Address Box No. 918, care of INDIA RUBBER WORLD.

LATEX CHEMIST,
with all-round experience in chemical and pharmaceutical industry. Last eight years in charge Rubber-Latex Division of well-known concern: Compounding, Development, Application. Synthetic and Natural. Organic Ph.D. Address Box No. 919, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER, 27, FOUR YEARS' EXTENSIVE EXperience in product development, research of water dispersions and solvent solutions of synthetic, natural, reclaimed rubbers for adhesives, coatings, saturants, binders; vinyl resin coatings; dipped goods; sales service work. Desires responsible position to utilize extensive knowledge. Address Box No. 930, care of INDIA RUBBER WORLD.

TECHNICAL EXECUTIVE WITH 20 YEARS' EXPERIENCE IN rubber and plastics desires position with medium-size or small company in capacity of Factory Manager, Laboratory Director, Technical Superintendent, Sales, or Technical Service. Fully qualified in compounding, research, development, and manufacturing. Familiar with factory processing and machinery and latest testing equipment and testing techniques. Wide acquaintance in the industry. Address Box No. 933, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITY

FOR SALE OR LEASE: COMPLETE RUBBER PLANT IN OPERating condition within 60-mile radius of New York City. Capital available. Willing to accept partnership with responsible party. Address Box No. 927, care of INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.

Our chemical, bacteriological, engineering and medical staff with completely equipped laboratories are prepared to render you Every Form of Chemical Service.

Ask for Booklet No. 15, "The Chemical Consultant and Your Business"

29 W. 15th St. **New York 11, N. Y.**

The JAMES F. MUMPER Company
ENGINEERS

Plant location, examinations and reports. Layouts, buildings, and services engineered for economical operation. Special machinery, line production to REDUCE COSTS.

313-14-15 Everett Bldg. **Akron 8, Ohio**

HAVE *YOU* ORDERED YOUR COPY OF THE REVISED

COMPOUNDING INGREDIENTS FOR RUBBER?

A *MUST* FOR EVERY COMPOUNDER TODAY.

$5.00 POSTPAID IN U.S.A. $6.00 ELSEWHERE — ADD 2% SALES TAX IN N. Y. CITY

INDIA RUBBER WORLD

386 FOURTH AVE. NEW YORK 16, N. Y.

CABLE ADDRESS: ROTEXRUB-NEWARK, N. J.
37 YEARS EXPERIENCE IN THE RUBBER LINE
TELEPHONE HUMBOLDT 2-3082

ROTEX RUBBER COMPANY, INC.

IMPORT

OFFICE AND WAREHOUSE
437 RIVERSIDE AVE. NEWARK 4, N. J.

EXPORT

GRADED RUBBER WASTE — UNVULCANIZED COMPOUNDS — TIRE AND TUBE SCRAP — VINYL PLASTIC SCRAP

(Classified Advertisements Continued on Page 859)

United States Rubber Statistics

(All Figures in Long Tons, Dry Weight.)

	April, 1947						May, 1947					
	New Supply			Distribution		Stocks, End	New Supply			Distribution		Stocks, End
	Production	Imports	Total	Consumption	Exports	of Month	Production	Imports	Total	Consumption	Exports	of Month
Natural Rubber: Total	.....	55,937	55,937	43,020	0	288,088	.....	81,609	81,609	42,298	1,730	325,669
Smoked sheets*	.....	12,840	12,840	15,533	0	103,385	.....	27,291	27,291	16,708	0	113,968
Thin crepe*	.....	117	117	113	0	2,237	.....	154	154	115	0	2,276
Thick crepe*	.....	265	265	598	0	8,485	.....	207	207	686	0	8,006
All other	.....	42,715	42,715	26,776	0	173,981	.....	53,957‖	53,957	24,789	1,730a	201,419
Natural Latex: Total	.....	39	39	798	0	4,882	.....	1,129	1,129	720	0	5,291
Normal	.....	0	0	9	0	85	.....	480	480	10	0	555
Centrifuged	.....	25	25	789	0	4,777	.....	638	638	708	0	4,707
Creamed	.....	14	14	Below 0.5	0	20	.....	11	11	2	0	29
Natural Rubber and Natural Latex: Total	.....	55,976	55,976	43,818	0	292,970	.....	82,738	82,738	43,018	1,730	330,960
Synthetic Rubber: Total	48,773† / 1,344‡	4	50,121	54,333	357	116,879	37,706† / 1,363‡	0	39,069	48,692	433	106,823
GR-S	39,129† / 88‡	0	39,217	43,667	100	87,147§	28,360† / 31‡	0	28,391	39,628	233	74,145§
Butyl	7,280†	4	7,284	6,930	0	19,020	7,160†	0	7,160	5,884	49	20,247
Neoprene	2,364† / 739‡	0	3,103	3,392	218	7,072	2,186† / 720‡	0	2,906	2,868	116	6,994
Nitrile types	517‡	0	517	344	39	3,640	612‡	0	612	312	35	3,905
Natural Rubber and Latex, and Synthetic Rubber: Total	50,117	55,980	106,097	98,151	357	409,849	39,069	82,738	121,807	91,710	2,163	437,783
Reclaimed Rubber	26,696	0	26,696	25,066	1,073	33,527¶	25,408	0	25,408	21,908	1,271	37,145b
Grand Totals	76,813	55,980	132,793	123,217	1,430	443,376	64,577	82,738	147,215	113,618	3,434	474,928

*No. 2 grade or better.
†Government plant production.
‡Private plant production.
§Includes stocks shipped for export, but not cleared.
¶Includes inventory adjustment of 1,030 long tons.
‖Includes 349 tons of guayule imported in April.
aConsists of 15 tons for January, 1,206 tons for February, and 509 tons for March.
bIncludes inventory adjustment of 1,389 tons.

Malayan Rubber Statistics

The following statistics for June, 1947, have been received from Singapore by way of Malaya House, 57 Trafalgar Square, London, W.C.2, England.

Ocean Shipments from Singapore and Malayan Union—in Tons

	Sheet and Crepe			Latex, Concentrated Latex, and Revertex (Dry Rubber Content)		
	Singapore	Malayan Union		Singapore	Malayan Union	
To	Export Proper	Transhipped	Direct Shipments	Export Proper	Transhipped	Direct Shipments
Argentine Republic	10	..	..	13	..	..
Australia	698	40	..	9	83	..
Belgium	243	62	813	6	..	..
British India	..	50	100	..	..	..
Burma	..	..	3	..	..	..
Canada	1,474	..	1,359	61	..	4
Chile	46	..	20	..	..	..
China	2	..	19	..	..	..
Colombia	..	..	150	..	..	..
Cuba	170	..	200	..	..	..
Cyprus	..	..	1	..	..	..
Czechoslovakia	312	..	10	20	..	19
Denmark	..	..	110	2	..	..
Egypt	9	..	63	..	..	..
Finland	..	..	..	22	..	..
France	920	50	773	..	..	..
Germany	60	25	..	..	..	..
Greece	267	30	..	..	..	..
Hong Kong	576	..	..	..	..	..
Iraq	..	..	2	..	..	..
Italy	532	50	852	7	..	..
Netherlands	460	20	460	6	..	..
New Zealand	275	1	..	..	..	..
Norway	34	..	78	1	..	..
Other British Countries in Africa	16	..	..	..	..	..
Europe	2	..	..	..	..	..
Other countries in South America	..	..	50	..	..	..
Palestine	8	..	9	..	..	..
Philippine Islands & Sulu	20	..	..	..	..	..
Poland	..	..	400	..	..	..
Portugal	75	..	60	..	..	..
Rumania	24	..	..	..	..	..
Spain	..	..	50	..	..	..
Sweden	260	12	322	..	..	..
Switzerland	7	..	..	14	..	..
Syria	2	..	..	..	..	..
Turkey	80	..	32	..	..	..
United Kingdom	2,997	900	4,259	260	22	..
Union of South Africa	500	9	..	1	..	..
U. S. A.	16,018	2,390	20,939	745	..	377
TOTAL	26,097	6,639	31,134	1,167	105	400
GRAND TOTAL		60,870			1,672	

Foreign Imports of Rubber in Long Tons

Singapore Imports from	Dry Rubber	Wet Rubber (Dry Weight)
Banka and Billiton	9	....
British North Borneo	610	7
Brunei	66	1
Dutch Borneo	1,544	101
Java	271	....
Other Dutch Islands	32	....
Rio Residency	286	2
Sarawak	1,810	....
Siam	313	42
Sumatra	9,798	5,954
TOTAL	14,739	6,107
Malayan Union Imports from		
Burma	39	6
Siam	408	6
Sumatra	1,513	641
TOTAL	1,960	653

Dealers' Stocks	Tons
Singapore	59,627
Penang & Province Wellesley	16,430
TOTAL	76,057
Port Stocks in Private Lighters and Railway Godowns	
Penang & Province Wellesley	5,230
Port Swettenham	3,808
Singapore	11,900
Teluk Anson	469
TOTAL	21,407

1946 Shipments of Rubber Goods

The United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., in a recent survey revealed that manufacturers' shipments of rubber products in 1946 totaled 2.4 billions of dollars, contrasted with 2.6 billions in 1945 and 0.9 billion in 1939.

The Department also reported that in June, 1946, there were 1,300 firms manufacturing rubber products, against 1,100 in December, 1943, an increase of 18%.

OUR NEW MACHINERY
HYDRAULIC PRESSES
CUTTERS—LAB. MILLS
BRAKES—LIFT TABLES
MILLS—MIXERS
SUSAN GRINDERS

NEW MACHINERY REBUILT

OUR 5-POINT REBUILDING PROCESS
1—INSPECTION
2—DISASSEMBLY
3—REBUILDING
4—MODERNIZING
5—GUARANTEE

L. ALBERT & SON
COAST-TO-COAST
TRENTON, N. J.—MAIN OFFICE

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE

LIQUIDATING SURPLUS EQUIPMENT (BOSTON AREA): 1—Watson-Stillman Hydro-Accumulator System, 6' diameter ram, 30" stroke at 2500 to 3000 p.s.i., with high-pressure pump, low-pressure pump, compressor, tank, and boiler. 4—36 x 40" Hydraulic Presses, 22" rams, 4 opening and 6 opening. 1—48 x 48", 4—10" rams, 4 opening, 2000# pressure. Line of 2—18 x 50" Mills with enclosed reduction drive and 150 h.p. motor. 2—18 x 50" Mills with drives. Hydraulic Rubber Cutter. 6—2¾ x 8" Aldrich Triplex Hydraulic Pumps with 7½ h.p. motors. Many Other Items. Send for Detailed List. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 7, N. Y.

FOR SALE: 1—WESTINGHOUSE D.C. MOTOR, TYPE SK, 15 H.P., 230 V., 825 R.P.M. with Fuse Switch Box, Starter Box, and Rheostat; 1—Cameron Core Cutter with 2 H.P. Motor and ½" Core Bar, 2—¾" Core Bars. Address Box No. 928, care of INDIA RUBBER WORLD.

FOR SALE:

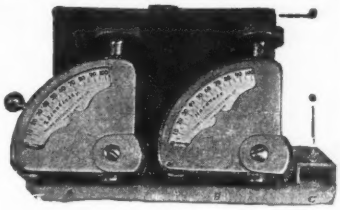
One motor-driven Hose Making Machine, 52 ft. long, Capacity ⅜" to 2½" O. D. Hose.
One Black Rock Mfg. Co. Roll Grinder 4LX.
One Vertical Hydro-pneumatic Air Tank for 275 lbs. hydraulic pressure — 4 ft. 6 in. x 11 ft. 1 in.
One high-pressure Pump 16" x 6" x 16".
One Rubber Cement Filter, model 14, with pump, manufactured by Sparkler Mfg. Co.

Full details and prices on request.

CONTINENTAL RUBBER WORKS
Erie, Pennsylvania

SPECIALIZING IN
USED MACHINERY FOR THE **RUBBER**
AND ALLIED INDUSTRIES
MILLS, CALENDERS, HYDRAULIC PRESSES,
TUBERS, VULCANIZERS, MIXERS, ETC.
ERIC BONWITT 431 So. Dearborn St., Chicago 5, Ill.

An International Standard of Measurement for—
Hardness • Elasticity • Plasticity of Rubber, etc.



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It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool-proof.
Ask for our Descriptive Bulletins and Price List R-4 and R-5
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Agents in all foreign countries.

Economical **NEW** Efficient
Mills - Spreaders - Churns
Mixers - Hydraulic Presses
Calenders
...GUARANTEED...
Rebuilt Machinery for Rubber and Plastics
LAWRENCE N. BARRY
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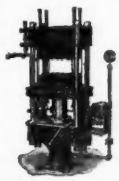


PLASTICS **MOLDING PRESSES**
Plain or Semi-automatic—Any Size or pressure — Pumps, Valves, etc.
Dunning & Boschert Press Co., Inc.
336 W. WATER ST. SYRACUSE, N. Y.

GUARANTEED REBUILT MACHINERY
IMMEDIATE DELIVERIES FROM STOCK
MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS
HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS
UNITED RUBBER MACHINERY EXCHANGE
319-323 FRELINGHUYSEN AVE. CABLE "URME" NEWARK, N. J

(*Classified Advertisements Continued on Page 861*)

Continental-Mexican Rubber Co., Inc.
745 Fifth Ave., New York 22, N. Y.

Producer in Mexico of

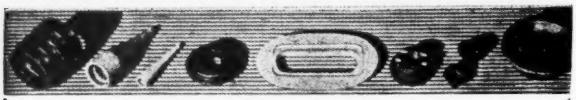
GUAYULE RUBBER

Washed — AMPAR BRAND — Dried

Formerly Distributed By

CONTINENTAL RUBBER CO. OF NEW YORK

An Affiliated Company



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FROM NATURAL, RECLAIMED, AND SYNTHETIC RUBBER

THE BARR RUBBER PRODUCTS CO. SANDUSKY OHIO

BUTENE POLYMERS

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245 FIFTH AVENUE NEW YORK 16, N. Y.

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STOCK SHELLS HOSE POLES
MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.
868 WINDSOR ST. HARTFORD, CONN.
Representatives
Akron San Francisco New York

GRANULATED CORK

FOR EXTENDING RUBBER

SOUTHLAND CORK COMPANY
P. O. BOX 868 NORFOLK, VA.

HOWE MACHINERY CO., INC.
30 GREGORY AVENUE PASSAIC, N. J.
Designers and Builders of
"V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, Expanding Mandrels, Automatic Cutting, Skiving, Flipping and Roll Drive Wrapping Machines.
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or write.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	June, 1947		June, 1946	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Balata ..... *lbs.*	11,564	$ 12,290	1,500	$ 4,973
Crude rubber ..... *lbs.*	6,839,689	1,339,687	302,288	47,201
Gutta percha ..... *lbs.*	.....	.....	1,000	2,939
Latex ..... *lbs.*	484,647	154,873	76,435	49,184
Rubber, powdered and waste ..... *lbs.*	1,681,300	36,256	1,421,400	22,641
Recovered ..... *lbs.*	1,889,600	145,126	1,802,100	151,138
Synthetic and substitute ..... *lbs.*	226,200	60,148	379,500	103,794
TOTALS.	11,133,000	$1,698,380	3,984,215	$ 381,870
PARTLY MANUFACTURED				
Comb blanks of hard rubber	.....	$ 6,363	.....	$ .....
Hard rubber in rods or tubes ..... *lbs.*	2,868	3,515	3,814	2,665
Rubber thread, not covered ..... *lbs.*	7,078	9,556	5,034	5,764
TOTALS.	9,946	$ 19,434	8,848	$ 8,429
MANUFACTURED				
Bathing shoes ..... *prs.*	5,430	$ 2,512	.....	$ .....
Belting	.....	54,979	.....	42,706
Boots and shoes of rubber, n.o.p. ..... *prs.*	15,939	16,039	11,779	7,111
Canvas shoes with rubber soles ..... *prs.*	1,066	2,356	135	468
Cement	.....	45,693	.....	35,859
Clothing of waterproofed cotton or rubber	.....	5,578	.....	4,351
Druggists' sundries	.....	53,619	.....	36,993
Gaskets and washers	.....	41,093	.....	18,634
Gloves ..... *doz prs.*	985	4,448	817	2,999
Golf balls ..... *doz.*	1,580	5,682	364	1,827
Heels ..... *prs.*	2,862	483	2,282	253
Hose	.....	45,167	.....	29,614
Hot water bottles	.....	2,564	.....	3,607
Inner tubes, n.o.p. ..... *no.*	7,512	15,917	309	1,529
Bicycle ..... *no.*	1,836	962	2,580	1,716
Liquid sealing compound .	.....	6,241	.....	13,820
Mats and matting	.....	22,664	.....	30,653
Nursing nipples ..... *gross*	1,285	5,344	1,039	3,610
Packing	.....	15,241	.....	12,420
Raincoats ..... *no.*	879	1,812	4	50
Tires pneumatic, n.o.p. *no.*	22,924	288,026	391	18,545
Bicycle ..... *no.*	3,392	4,058	2,682	3,392
Solid for automobiles and motor trucks *no.*	31	705	6	216
Other	.....	10,467	.....	957
Tire repair material	.....	13,710	.....	4,523
Other rubber manufactures	.....	363,667	.....	266,125
TOTALS.	.....	$1,029,027	.....	$541,978
TOTAL RUBBER IMPORTS.	.....	$2,746,841	.....	$932,277

Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber ..... *lbs.*	2,410,196	$ 461,430	1,305,981	$ 266,819
Waste rubber ..... *lbs.*	1,573,500	19,607	1,563,700	23,913
TOTALS.	3,983,696	$ 481,037	2,869,681	$ 290,732
PARTLY MANUFACTURED				
Soling slabs of rubber *lbs.*	.....	$	1,605	$ 1,653
MANUFACTURED				
Bathing caps	.....	$ 744	.....	$ 176
Belting, n.o.p. ..... *lbs.*	385,325	263,017	340,043	206,792
Belts, fan	.....	4,439	.....	6,495
Boots and shoes of rubber, n.o.p. ..... *prs.*	518,822	785,555	125,972	197,268
Canvas shoes with rubber soles ..... *prs.*	259,236	236,334	47,740	49,040
Clothing of rubber and waterproofed clothing ..	.....	40,195	.....	14,997
Heels ..... *prs.*	171,303	10,898	142,471	12,773
Hose	.....	113,930	.....	54,579
Inner tubes for motor vehicles ..... *no.*	67,712	189,730	50,011	106,257
Soles ..... *prs.*	800	164	94,367	15,868
Tires, pneumatic for motor vehicles .... *no.*	65,561	1,271,148	41,700	744,143
Other ..... *no.*	1,169	1,277	306	2,942
Wire and cable, copper, insulated	.....	239,869	.....	75,307
Other rubber manufactures	.....	74,490	.....	39,843
TOTALS.	.....	$3,231,790	.....	$1,526,480
TOTAL RUBBER EXPORTS.	.....	$3,712,827	.....	$1,818,865

"Market Research." Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. 8 pages. This bulletin, one of a series on services offered by the company, outlines forms of market research which can be performed. Information appears on other company publications besides a list of other bulletins in the series.

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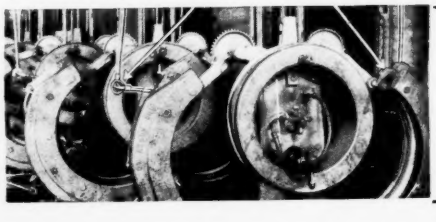

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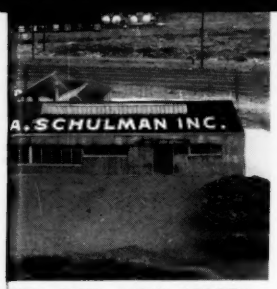

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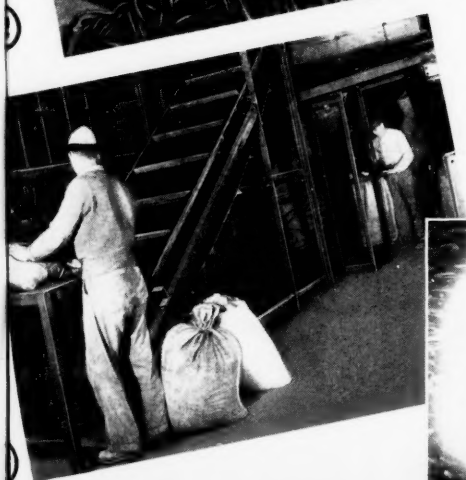

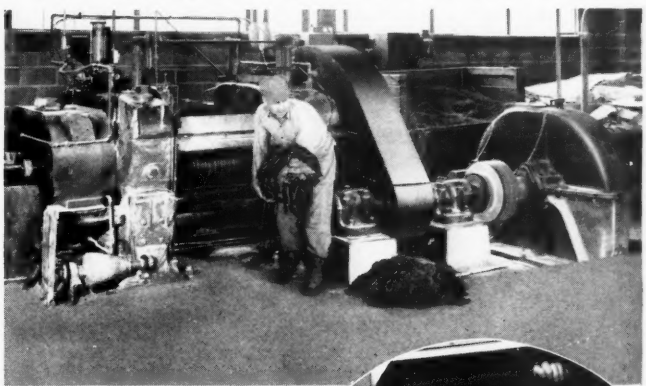

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